THE IRON TRADE REVIEW

VOLUME XXXVIII CLEVELAND, OHIO, MAY 18, 1905 NUMBER 20

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The deadlock in the iron trade continues, but it is a wait for better data as to the price basis for the next buying movement, and not necessarily an indication of a check upon consumption. The question of real and immediate importance is what the actual consumption has been in the past three months, and how much of the output of the mills in that period has gone into stocks in the hands of middlemen and consumers. That railroads are not through with their buying programs and that construction work throughout the country is to make important additional demands upon the mills in the remainder of the year, is quite well assured. In some directions, too, there are indications of improvement in the foundry trade, which has so long been the laggard that betterment is the turn to be expected.

The considerations that operate against an active market for the time being are the technical ones, largely growing out of two conditions—first, that as the trade moved out of months of depression last fall, buying was at considerably lower prices than today's, and new contracts raise a question; second, that the pig iron statistics show that the balance has at last swung over and now indicates a production slightly in excess of consumption. Neither of these things reflects any change in the factors that make for pronounced industrial activity throughout 1905. Because the fears expressed two months ago of a runaway market have not been realized, there has been in some quarters a feeling that the counter-movement must be marked.

Construction work still stands out as the strong feature of current demand. The American Bridge Co. closed 12,000 tons on well distributed buying the past week and estimates a total of 70,000 tons for May. Bids on the new Pennsylvania railroad station foundations in New York have gone in, representing 20,000 to 21,000 tons, and the superstructure will require 40,000 tons more. At Chicago the steel for the new Baldwin building was let. On the lakes, contracts for three large freighters were closed in the week for delivery in 1906. They will require about 14,000 tons of steel. The American Shipbuilding Co. now has 11 boats to build for next year, and never has had so many contracts so far ahead. That the car-building programs of the railroads are to go farther is now more certain than appeared only recently. The total of steel car orders placed this year is now estimated at 53,000 and of all cars, at 105,000. Considerable additions to the rail tonnage of 1905 are also expected.

Important to the sheet and tinplate trades was the meeting of independent manufacturers at Pittsburg and the decision to give options on their plants with a view to consolidation. The co-operation of an important steel making interest is a part of the plan, which looks to distinct improvement in these important markets. Production of both sheets and tin plates has for some time been in excess of consumption and prices have felt the weight of the large output.

Steel bar contracts for the second half of the year are not expected to be nearly as large as those of the latter part of 1904. It is plain that some buyers in agricultural lines covered for most of this year when they placed their orders at 1.30c. though the material was stipulated to be taken out before July 1 and will be so taken out.

The meeting of wire manufacturers at Chicago last week is understood to have taken no action on prices, but to have resulted in better understanding between a Western mill and the leading interest as to some questions that have come up in Western territory.

The pig iron market has been in a condition for some time that made it peculiarly sensitive to the influences of the statistics of stocks and production for May 1. Production of coke and anthracite iron in April was reported at 1,922,041 tons, or at a daily rate in excess of that for March. Capacity of coke and anthracite furnaces on May 1 was 451,331 tons a week, as against 439,564 tons on April 1, which, with an increase of 17,000 tons in merchant furnace stocks of coke iron in April shows that further accumulation is likely in the present month. But the counter-movement has begun. The long and strenuous campaigns of the furnaces have brought the expected result. Three important furnaces in the Central West have gone out for relining in the past week, and more will follow. In all pig iron markets the feeling is easier as the weeks pass without the appearance of buying. For Southern iron $13 Birmingham is now quoted, and on Northern irons, both in the East, where lines have been well held by the furnaces, and in the Central West, quotations are from 25 to 50 cents lower. The market is practically lifeless.

A movement that may have an important influence on the market for steel-making pig iron has been undertaken at Pittsburg, looking to the establishment of a sales agency for Bessemer and basic iron. The plan involves the appointment of a committee to govern sales, and the devising of means for carrying pig iron stocks so that the market may not be affected by forced sales. The correction of underselling by middlemen is also aimed at. A meeting of furnace representatives will be held shortly to canvass the situation.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, May 16.

The foundry trade throughout this district is now showing decided improvement and for the first time in months the gray iron shops have a considerable tonnage ahead. Shipments of iron, suspended some time ago, are being resumed and there is more inquiry for small lots for immediate delivery. An early resumption of buying on the part of the foundries to cover future requirements is expected and the iron market will benefit materially from the improvement in foundry lines. There has been little buying of iron in the past week and it is doubtful if orders of any size will be placed this month, although considerable business is expected early in June to cover third quarter requirements. One merchant furnace in the Mahoning Valley will go out this week for relining, while one stack of the Carnegie Steel Co., at Youngstown, is scheduled to go out soon for the same reason. That there will be additional idle capacity in the near future is certain, as many of the furnaces that have been operated to the limit of their capacity are badly in need of repair. This will reduce pro-

duction, which has been at a record point during the past two months, and will also tend to strengthen the iron situation. Quotations on No. 2 iron are generally on the basis of $15.75 at furnace, but this could be shaded on a large tonnage, while $15.25 could be done on Bessemer and basic.

In the heavy finished lines there is promise of still further buying of rails and cars by the railroads, as some of the roads that have already bought are now figuring on supplementary orders. The total number of steel cars placed for delivery this year has now reached about 53,000 and the total car orders placed, over 105,000. The Pennsylvania terminal contract for structural material will probably be placed this week, amounting to 20,000 tons, and a large amount of work for new buildings and manufacturing plants is under consideration. In the finished lines merchant pipe and wire products show a slight improvement, while sheets and tin plate show little change. No large contracts for steel bars have yet been placed, and it is believed that the large consumers will have a considerable tonnage on hand by the termination of present contracts and sufficient to carry them well into the third quarter.

A project for the consolidation of a majority of the independent sheet and tin plate plants was launched here last week and all the manufacturers present pledged themselves to give options on their plants before June 1. Whether the deal is put through depends much on the values the manufacturers place on their property. A plan has also been suggested by which the sale of all the basic and Bessemer iron produced in the Mahoning and Shenango Valleys by merchant furnaces will be under the control of a committee which will have the power of fixing the price at which the iron is to be sold. It is stated that according to these plans a furnace operator in need of funds and who would ordinarily sell his iron at a sacrifice, can stock it and secure a loan through this committee to tide him over. In this way it is believed that prices can be maintained and the present shading entirely obviated.

A meeting of five or six of the leading wire interests was held in Chicago last Thursday to discuss trade conditions, but nothing was done with reference to prices. It is understood that the differences existing between one of the Western mills and the leading interest have been adjusted. The Amalgamated Association of Iron, Steel and Tin Workers, in convention at Detroit, has adopted the 1903-04 wage scale and will present it to the manufacturers. It restores wages preceding the reductions of 10 to 18 percent made last year, and while the manufacturers are not averse to granting some kind of an advance, it is doubtful if they will consent to the adoption of a scale that carries such a large increase in wages.

Pig Iron.—The improvement in the foundry trade will soon have its effect on the iron market, and with a resumption of buying quotations will become firmer, but an advance is not anticipated unless production is somewhat restricted. The Mary furnace, at Lowellville, O., is to go out this week for relining and one of the stacks of the Carnegie Steel Co., at Youngstown, is also to blow out shortly for the same purpose. Small lots of No. 2 foundry iron for early delivery have been sold during the week at $15.75 furnace, and this could be shaded 10 to 15 cents on a desirable tonnage. Basic and Bessemer are held nominally at $15.50 furnace, but $15.25 could be readily done. The sale of 30,000 tons to the Cambria Steel Co., noted last week, and which was at a price of $15.50 for May delivery, provides for the payment of the same price paid by the United States Steel Corporation for June and July requirements, and if no iron is purchased by the Corporation, the contract will be the average selling price during these months. We quote as follows:

Bessemer, Valley	$15 25 to 15 50
Bessemer, Pittsburg	16 10 to 16 35
No. 1 Foundry	17 25 to 17 50
No. 2 Foundry	16 60 to 16 85
Gray Forge, Pittsburg	15 60 to 15 75
Basic, Valley	15 35 to 15 50
Basic, Pittsburg	16 10 to 16 35

Steel.—All of the mills are making better shipments on billets and sheet bars and the latter can now be had at $25, while Bessemer billets have sold at $23. Bessemer rods are quoted at $34 and open-hearth $35.

Ferro-Manganese.—The market is quiet, and carload lots of 80 percent foreign are quoted at $50 to $51 Pittsburg.

Muck Bar.—The market is very quiet and neutral bars are held nominally at $27.85, Pittsburg.

Skelp.—While little new business has been placed in the past week, all of the mills are operating on contracts placed some time ago. Steel skelp, grooved, is quoted at 1.55c to 1.60c, and sheared at 1.65c; grooved iron, 1.70c and sheared, 1.75c to 1.80c.

Rails and Track Material.—Supplementary orders for rails from roads that have already placed contracts for the year's requirements are now being figured on and a good tonnage in addition to that already placed is looked for. Lower prices are again quoted on light rails, and most of the rerolling mills are idle. We revise quotations as follows: Fifty lb. and over 500 tons, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 lb., $26; 20 lb., $25; 25 to 45 lb., $23; angle bars for standard sections, 1.25c; spikes, 1.75c to 1.80c.

Bars.—Specifications continue heavy on steel bars, but no large contracts have yet been placed for requirements during the last half of 1905 or the first half of next year. That the average selling price of bar iron during the months of March and April should be 1.5c according to the bi-monthly settlement of the Amalgamated Association, is somewhat surprising, especially in view of the number of low priced contracts that were taken last fall by the iron manufacturers and which run through the first half of the year. We quote: Bar iron, 1.60c to 1.65c, Pittsburg; hoops, 1.65c, and bands, 1.50c, both taking bar extras. Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c, net; channels, angles, zees and tees, under 3 in., 1.65c. The following differentials are maintained on steel: Less than 2,000 lb. of a size and not less than 1,000 lb., 10 cents advanced; less than 1,000 lb. of a size, 30 cents advanced.

Cotton Ties.—While the bulk of the cotton tie business has already been placed, there is yet a considerable tonnage that will not be contracted for until the season is further advanced. We quote ties in 3,000 bundle lots and over at 85c and in less than 3,000 bundle lots at 88c.

Plates.—The continued activity of the steel car plants throughout the country compels the operation of plate mills at the limit of their capacity. The tank and boiler trade is also showing considerable improvement. We quote as follows: Tank plates, 1¼ in. thick, 6¼ in. to 14 in., inclusive, 1.50c f. o. b. mill Pittsburg; over 14 in. up to 100 in., 1.60c. Extras are as follows per lb.: Flange and boiler steel, 10c; marine, A. B. M. A., and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 in. up to 110 in. in width, not less than 5c per lb. extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to 120 in., 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific Coast.

Structural Material.—The contract for the New York terminal of the Pennsylvania Railroad will be placed in a few days, requiring 20,000 tons of steel. All of the structural shops have a large amount of work on which they are preparing estimates for new buildings and industrial plants. We quote as follows: Beams and channels up to 15 in., 1.60c; over 15 in., 1.70c; angles, 3 x 2 up to 6 x 6, 1.60c; zees, 1.50c; tees, 1.65c; angles, from 3 to 16 in., 1.60c; universal and sheared plates, 6¼ to 14 in., inclusive, 1.50c; over 14 in., 1.60c base.

Sheets.—The project launched here last week for the consolidation of a majority of the sheet and tin plate mills outside of the American Sheet & Tin Plate Co., if put through,

will greatly strengthen the sheet and tin plate markets. While the official price of sheets is 2.40c for 28 gauge, the bulk of the business is being done at an average price of 2.35c. We quote black sheets, carloads, as follows: No. 30, 2.70c to 2.80c; No. 29, 2.60c to 2.70c; No. 28, 2.30c to 2.40c; No. 27, 2.20c to 2.30c; Nos. 25-26, 2.20c to 2.25c; Nos. 23-24, 2.15c to 2.20c; Nos. 18-20, 2.10c to 2.15c; No. 16, 2.10c; Nos. 12-14, 2.05c; No. 9, 2c; No. 8, 1.95c; Galvanized, No. 30, 4.35c; No. 29, 3.85c; No. 28, 3.45c; No. 27, 3.25c; Nos. 25-26, 3.05c; Nos. 23-24, 2.85c; Nos. 18-20, 2.70c; No. 16, 2.55c.

Pipes and Tubes.—Owing to the activity of locomotive works the demand for boiler tubing is abnormal and all the mills are from three to four months behind on deliveries. Merchant pipe shows little improvement and concessions from published quotations continue to be made. Discounts to consumers, carload lots, f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	67	51	65	49
¼ to 6 inches	75	65	73½	63½
⅜ and ½ inch	71	59	69	57
7 to 12 inches	70	55	68½	53
Extra Strong Plain Ends.				
⅛ to ¾ inch	60	48	58	46
½ to 4 inches	67	55	65	53
4½ to 8 inches	63	51	61	49
Double extra strong plain ends, ½ to 8 inches	56	45	54	43

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inches	44	41
1 ¾ to 2½ inches	56	41
2½ inches	58	46
2¾ to 5 inches	64	53
6 to 13 inches	56	41

Less than carloads 2 points less.

Merchant Steel.—Demand for the finer grades of crucible steel is not heavy, although there is no dearth of orders for the cheaper brands. Demand for shafting is good and all the plants now have considerable business on their books. We quote: Cold rolled and ground shafting, 50 percent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.70c to 1.75c; toe calk, 2c to 2.05c.

Old Material.—The scrap market is absolutely lifeless, and dealers with large stocks on their hands are asking consumers to name their own prices. The prices offered by consumers are invariably so low that little tonnage is changing hands. We quote gross tons as follows: Heavy melting stock, $15 to $15.50; cast scrap, $14.75 to $15; sheet scrap, $14 to $14.50; cast borings, $9.50 to $10; No. 1 wrought, $17.25 to $17.50.

Coke.—Furnaces generally that have not covered requirements for the last half of the year are awaiting developments and are not inclined to contract at the present time. There is a slight improvement in the movement of foundry coke, but the general impression prevails among consumers that lower prices than are now prevailing should be made for last half requirements. We quote furnace coke for early delivery at $1.80 to $2, according to grade, and foundry at $2.60 to $2.75. During the week ending May 6, the upper Connellsville region produced 271,163 tons and the lower 82,225 tons.

Wire and Wire Nails.—A meeting of the leading wire interests was held in Chicago last Thursday to discuss trade conditions. No change in prices was made, but a better understanding was reached regarding present conditions of the market. The movement of wire products is improving and jobbers' stocks are moving rapidly. We quote: Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, and less than carloads, $1.95; painted barb wire, $1.95 for jobbers in carloads; retailers' carloads, $2, and less than carloads, $2.10, with 30c for galvanizing. Annealed smooth fence wire is held at $1.65, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron cut nails are held at $1.85 Pittsburg, and steel at $1.75.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, May 16.

Apathy is the prevailing note of Western markets. In pig iron scarcely anything has been done in the past week and the market for the time being has lapsed into a state of coma. Both Northern and Southern irons have been susceptible to the bearish conditions prevailing and are weaker in price. Southern irons is offered at $13 Birmingham for No. 2 foundry, and there are well founded reports to the effect that sales of Northern irons have been made at $17 Chicago for No. 2. Finished lines show no change from a week ago. Specifications for all the heavier forms, including plates, structural shapes, rails and steel bars, exceed the capacity of mills to deliver, despite the heavy pressure under which all of them are operating. In the lighter grades demand is not so insistent. Box annealed sheets are soft, and independent makers are shading prices as much as $2 a ton in the effort to stimulate new business. Wrought pipe is also weak, outside interests still holding to the card rates that were in force prior to the advance of $1 a ton April 20 by the leading producer. Intermediate rolled steel continues in active demand, one inquiry for 4 x 4 rerolling billets from a local mill running into five figures. Forging billets are firm, Western makers asking $30 to $32 Chicago. Little interest is shown in steel bars for the last half, and in view of the heavy tonnage that were bought five or six months ago, it is doubtful if there will be any considerable buying until fall or toward the close of the year. Bar iron is quiet, though specifications against old contracts come in steadily. No change is noted in wire products, prices remaining firm and demand good.

Pig Iron.—This market appears to be at a standstill. The little trading that has been done is comprised in a few sales of carload lots and an occasional order for 100 tons. Under the stress of this inactivity, Northern and Southern irons have weakened in price. While no sales are known to have been made at these figures, it is given out by furnace representatives that bona fide tonnage of fair dimensions would bring out a price of $13 Birmingham or $16.65 Chicago for No. 2 iron from Southern producers, and $17 Chicago for Northern No. 2 from local furnaces. Foundrymen, however, have not shown any willingness to accept these quotations, although in view of the well filled condition of furnace books, it is not believed that better prices can be obtained for some time to come. Foundrymen generally are well covered for the next six weeks and seem to prefer waiting a while longer before making any engagements for the last half. Investigation shows that a majority of the Western melters are unprotected for this period, and an active buying movement is looked for as soon as the trade can make up its mind to go ahead again. We have revised our prices and quote as follows:

Lake Superior charcoal	$17 50 to 18 00
Northern Foundry No. 1	17 75 to 18 00
Northern Foundry No. 2	17 25 to 17 50
Northern Foundry No. 3	16 75 to 17 00
Northern Scotch Foundry	17 75 to 18 00
Ohio Strong Softeners No. 1	19 30 to 19 80
Ohio Strong Softeners No. 2	18 30 to 18 80
Southern Foundry No. 1	17 15 to 17 40
Southern Foundry No. 2	16 65 to 16 90
Southern Foundry No. 3	16 15 to 16 40
Southern Foundry No. 4	15 90 to 16 15
Southern No. 1 Soft	17 15 to 17 40
Southern No. 2 Soft	16 65 to 16 90
Southern Gray Forge	15 90 to 16 15
Southern Mottled	15 90 to 16 15
Southern Silveries (4% to 6% Silicon)	18 65 to 19 15
Jackson Co. Silveries (6% to 8% Silicon)	21 30 to 22 30
Jackson Co. Silveries (8% to 10% Silicon)	22 30 to 23 30
Alabama and Georgia Car Wheel	20 45 to 20 90
Malleable Bessemer	17 50
Basic Iron	16 65 to 17 15

Billets.—There continues to be an active demand for both rerolling and forging billets in this market. One local mill has under consideration the purchase of a large tonnage of 4 x 4 billets which it expects to close up before the end of the month. All prices are firm. We quote Bessemer wire rods, $34 Pittsburg, and chain rods, $35 Pittsburg. Sheet bars have been offered at $29.50 Chicago, this being the last quotation

made. Bessemer or open-hearth rolling billets are quoted at $28 Chicago; forging billets, $30, Chicago.

Bars.—There is a better tone to the bar iron market, and now that local prices more closely approach those for steel it is expected there will be a better demand. Specifications for iron are active and up to full contract requirements. The interest in steel is confined to specifications. These continue voluminous and to the full capacity of mills. Prices are without change and we quote carload lots, mill shipments, Chicago delivery, as follows: Bessemer and open-hearth bars and bands, 1.66½c base, half extras; soft steel angles, less than 3 x 3, 1.76½c hoops, 1.81½c base, full extras. Store trade is active and prices are firm. We quote bar iron, 1.90c base, full extras; soft steel bars and bands, 1.85c to 1.95c base, full extras; soft steel angles, channels and tees, under 3 in., 1.95c to 2.05c; hoops, 2.20c base, full extras.

Sheets.—Independent makers of light sheets are finding new business very elusive. Prices are shaded as much as $2 a ton to stimulate demand, but thus far without much success. Blue annealed sheets and galvanized are moving freely. With the above reservation, we quote "official" prices on carload lots, mill shipments, Chicago delivery, as follows: Blue annealed sheets, Nos. 9 and 10, 1.86½c to 1.91½c; Nos. 11 and 12, 1.91½c to 1.96c; Nos. 13 and 14, 1.96½c to 2.01½c; Nos. 15 and 16, 2.06½c to 2.11½c. On box annealed, one pass cold rolled, we quote Nos. 18 and 20, 2.31½c to 2.36½c; Nos. 22 and 24, 2.36½c to 2.41½c; Nos. 25 and 26, 2.41½c to 2.46½c; No. 27, 2.46½c to 2.51½c; No. 28, 2.56½c to 2.61½c; No. 29, 2.66½c to 2.71½c; No. 30, 2.76½c to 2.81½c. We quote on lots from warehouse stocks as follows: No. 10, 2.10c to 2.15c; No. 12, 2.15c to 2.20c; No. 14, 2.20c to 2.25c; No. 16, 2.30c to 2.35c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.85c; No. 28, 2.85c to 2.95c; No. 29, 3c to 3.05c. Galvanized sheets, mill shipments, Chicago delivery, are quoted as follows: Nos. 12 and 14, 2.56½c; No. 16, 2.71½c; Nos. 18 and 21, 2.86½c; Nos. 22 and 24, 3.01½c; No. 26, 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c. Jobbers' prices on lots from store have also been revised, and are now as follows: Nos. 10 to 14 inclusive, 3.10c; No. 16, 3c; Nos. 18 and 20, 3.10c; Nos. 22 and 24, 3.25c; No. 26, 3.50c; No. 27, 3.70c; No. 28, 3.95c; No. 29, 4.40c; No. 30, 4.85c.

Structural Steel.—Contracts for the erection of the Baldwin building in Chicago were closed up last week and call for the supply of between 2,000 and 3,000 tons of structural steel. With this exception, the local market has been quiet so far as new business is concerned. Specifications continue heavy, mills finding no opportunity to catch up on back orders. Premiums of $2 a ton are cheerfully paid for prompt shipment of material. This applies more particularly to the lighter shapes. With this exception we quote mill shipments, Chicago delivery, as follows: Beams and channels, 3 to 15 in., inclusive, 1.76½c; angles, 3 to 6 in., ¼ in. and heavier, 1.76½c; angles larger than 6 in., on one or both legs, 1.86½c; beams larger than 15 in., 1.86½c; zees, 3 in. and over, 1.76½c; tees, 3 in. and over, 1.86½c; with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. We quote prices from store as follows: 2.10c to 2.25c for angles, beams and channels, base sizes, with 2.20c to 2.30c for 18, 20 and 24-in. beams; tees and zees, 2.15c to 2.25c. These prices are for either random lengths or cut to specifications in excess of 5 ft.

Plates.—Except that specifications continue very heavy, nothing of interest has come up in the week. Corporation mill books are loaded with orders and it is impossible to get deliveries on new business within four to six months. Such independent mills and jobbers as are not tightly sold up are asking premiums ranging to $5 a ton on orders for immediate delivery. We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼ in. and heavier, 6⅛ in. to 100 in., 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base, all full extras. Plates, 3-16 in. thick, $2 extra; gauges 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store quotations are as follows: Tank steel, ¼ in. and heavier, up to and including 72 in. wide, 2c; over 72 in. wide up to 100 in., 2.10c; over 100 in. wide, usual mill extras, 3-16 in. up to but not including 72 in. wide, 2.10c; 3-16 in., 72 in. wide, 2.35c; flange steel, 25c extra; heads, 25c extra.

Rails and Track Supplies.—Some new tonnage in standard sections is taken every week by the local producer, though the bulk of it is turned over to the Eastern mills of the Corporation for delivery. Outside mills are also taking on a fair tonnage from week to week. Specifications for light rails and track supplies are active, Western mills being tightly sold up on both products. We quote heavy sections in 500 ton lots and over, f. o. b. mill, $28; less than 500 tons to carload lots, $30; less than carload lots, $32. Light rails are as follows: 12-lb. sections, $27; 16-lb., $26; 20 and 25-lb., $25; 30, 35, 40 and 45-lb. sections, $24, all f. o. b. Milwaukee mill. Track supplies, f. o. b. Joliet mill. Angle bars, 1.40c to 1.50c; spikes, first quality, 1.75c to 1.80c; track bolts, 3¼ x ¾, with square nuts, 2.40c to 2.50c per lb., with hexagon nuts, 2.55c to 2.65c.

Merchant Steel.—Further contracting was done last week by several implement interests for the tonnage they will require in the last half in certain of the specialties listed below. Specifications are heavy and continually to the full capacity of mills. Prices are without change, and we quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c; plow steel, 2.20c and upward according to quality; toe calk steel, 2.21½c. Cold rolled shafting, 50 percent off in carload lots and 45 percent in less than carload lots. Crucible tool steel, 61½c to 8c; special grades of tool steel, 13c and upwards.

Merchant Pipe.—Independent producers are not meeting the last advance of the leading producer, whose quotations are given below. Generally these interests are asking $1 a ton below such discounts. Demand is of fair proportions, most of the material going into immediate consumption. With the above reservation, we quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inches	65.85	49.85	63.85	47.85
⅜ to ½ inches	69.85	57.85	67.85	55.85
¾ to 6 inches	73.85	63.85	72.35	62.35
7 to 12 inches	68.85	53.85	67.35	51.85
PLUGGED AND REAMED.				
	Steel.		Iron.	
1 to 4 inches	71.35	61.35	69.85	59.85
EXTRA STRONG PIPE.				
⅛ to ⅜ inches	58.85	46.85	56.85	44.85
½ to 4 inches	65.85	53.85	63.85	51.85
4½ to 8 inches	61.85	49.85	59.85	47.85
DOUBLE EXTRA STRONG PIPE.				
½ to 8 inches	54.85	43.85	52.85	41.85

Boiler Tubes.—No change is to be noted in this material. Demand is of fair proportions and prices are holding up well. We quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	Steel.	Iron.	Seamless.
1 to 1½ inches	40.35	37.35	52.00
1¾ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	Up to 4½ inches 50.50
6 to 13 inches	52.35	37.35	

Less than carload lots from store, as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches, inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½
6 inches and larger	50	35	

Cast Iron Pipe.—No municipal contracts have been closed up in the week under review, and only one order is pending—that for the city of Cleveland which will amount to about

3,000 tons. Carload quotations are without change, these being for Chicago delivery, as follows: 4-in., $29; 6-in. and larger, $28; gas pipe, $1 a ton higher.

Wire Products.—A falling off in demand is noted in some quarters, especially in the Southwestern districts. This is not so much of a surprise, however, as producers expect a lull in consumption about this time of the year. The manufacturing trade is specifying freely against contracts, the demand from these sources having been very heavy all through the year. Prices continue to be shaded by jobbers and independent producers, according to reports. We quote the prices of the leading interest for carload lots to jobbers, Chicago delivery, as follows: Wire nails, $1.95; painted barb wire, $2.10; galvanized barb wire, $2.40; smooth annealed wire, $1.80; smooth galvanized wire, $2.10; polished staples, $2.05; galvanized staples, $2.35. Less than carload lots to jobbers are 5 cents higher than above prices. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10 cents extra on less than carload lots. Bale ties are unchanged at 82½ and 5 percent and 85 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet and DeKalb, with actual freight allowed not exceeding 30 cents per 100 lb.

Coke.—The local coke market has been more active in the past week than for some time. Despite the accumulations of demurrage fuel, prices for contract coke for future delivery are firm. Connellsville 72-hour is held at $5.15 Chicago, or $2.50 at the ovens. Wise County, Va., coke is quoted $2.90 at the ovens, or $5.15 Chicago. Other brands of Virginia and West Virginia cokes are held around $2.50 at the ovens.

Old Material.—There is considerable resiliency to the local scrap market. At the present time it is difficult to quote current prices, because no two dealers agree in their ideas, but it is safe to say that a good sized order would bring out much lower prices than are at present named. Nothing has transpired in the past week to rouse the market from its lethargy, and until a better demand for pig iron and bar iron is felt, no improvement is looked for. We have reduced several of the quotations that were printed last week. For gross tons, local dealers are asking as follows:

Old steel rails (4 feet and over)	$14 50 to 15 00
Old steel rails (less than 4 feet)	13 50 to 14 00
Old iron rails	19 00 to 19 50
Relaying rails, subject to inspection	22 00 to 22 50
Old wheels	14 50 to 15 00
Heavy melting steel	12 00 to 12 50
Mixed country steel	9 00 to 9 50
Low phosphorus scrap (.05 and under)	13 50 to 14 00

The following quotations are for net tons:

No. 1 R. R. wrought	14 00 to 14 50
No. 2 R. R. wrought	13 00 to 13 50
Shafting	15 00 to 15 50
Dealers' forge, No. 1	11 00 to 11 50
Wrought pipe and flues	9 50 to 10 00
No. 1 cast, 150 lb. and less	13 00 to 13 50
No. 1 mill	9 00 to 9 50
No. 1 Busheling	9 50 to 10 00
No. 2 Busheling	8 50 to 9 00
Country sheet	7 50 to 8 00
No. 1 boilers, cut	9 00 to 9 50
Boiler punchings	12 50 to 13 00
Iron car axles	20 50 to 21 00
Steel car axles	15 00 to 16 00
Iron axle turnings	10 00 to 10 50
Cast borings	7 00 to 7 50
Mixed borings, etc.	7 00 to 7 50
Machine shop turnings	9 50 to 10 00
Railroad malleable	12 50 to 13 00
Agricultural malleable	11 50 to 12 00
Stove plate and light cast scrap	9 50 to 10 00
Old iron splice bars	17 00 to 17 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, May 17.

Iron Ore.—Shipments are being made so rapidly that it seems probable they will make a new record, possibly 5,000,000 tons shipped from upper lake ports. Steel companies have within a few days sent out inquiries for about 50,000 tons of ore, but no sales of consequence have been made. Quotations are as follows: Old range Bessemer (56.70 percent iron natural, .05 phosphorus), $3.85 to $4; Mesabi Bessemer, same content, $3.65 to $3.75; old range non-Bessemer (52.80 percent iron natural), $3.35; Mesabi non-Bessemer (52.80 percent iron), $3.20.

Pig Iron.—The market is very dull and sellers are divided into two classes: those who, having disposed of their product almost entirely for several months in advance, are not seeking business, and, when asked for quotations, base their prices on $16, Valley, for No. 2 foundry; and those who are eager for business and are ready to sell at $15.50, or even lower, for a good tonnage, but can find no buyers. A carload now and then is still being sold at $16. Sellers believe that the foundries are melting iron to such an extent that a buying movement will be started within 30 days. The demand for Bessemer has slackened and it is probable that some furnaces which expected to run on Bessemer will change to foundry grades. Local furnaces are still adhering to $16.25 for No. 2 iron delivered at Cleveland foundries. There is no demand for Southern iron even at $13 for No. 2, Birmingham, a quotation now freely made. Coke is weak, $2.50 for foundry being the usual quotation. We quote as follows, Cleveland delivery:

Bessemer	$16 10 to 16 35
No. 1 Foundry	16 75 to 17 00
No. 2 Foundry	16 25 to 16 50
No. 3 Foundry	15 50 to 15 75
No. 2 Southern	16 85 to 17 00
Gray Forge	15 75 to 16 00
Gray Forge, Southern	15 35 to 15 50
Lake Superior charcoal	18 00 to 18 25

Finished Material.—Jobbers report good business from stock and the mills of the largest producers are still far behind in deliveries on most of their products, but find new orders decreasing. A large majority of the contracts on which specifications are now being made were placed at figures below present quotations. Agricultural interests have made some inquiry concerning steel bars, but no contracting has yet been done, and it is not known what the attitude of these large buyers will be concerning the present price, 1.50c, Pittsburg. Bar iron is weaker, the usual selling price being 1.55c at the mills. There is very little demand for pipe and boiler tubes. Competition is still resulting in the cutting of prices of sheets and new orders are scare. The prices of the principal producers through jobbers are as follows: Cleveland delivery, the freight from Pittsburg being 9½ cents; mill sales of black sheets in carload lots, No. 10, 1.89½c; Nos. 11-12, 1.94½c; No. 14, 2.04½c; No. 16, 2.09½c; No. 27, 2.49½c; No. 28, 2.59½c. Galvanized mill sales, No. 14, 2.64½c; No. 16, 2.74¼c; Nos. 18-20, 2.89½c; Nos. 22-24, 3.04½c; Nos. 25-26, 3.24½c; No. 27, 3.44½c; No. 28, 3.64½c. Out of stock, black sheets, ¼ in., 1.95c; 3-16 in., 2.05c. Blue annealed, No. 10, 2.15c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.35c. One pass cold rolled: Nos. 18-20, 2.55c; Nos. 22-24, 2.60c; No. 26, 2.65c; No. 27, 2.70c; No. 28, 2.80c; No. 30, 3.20c.

Old Material.—Dealers, having grown tired of waiting, are letting scrap go at lower prices and there is quite a noticeable increase in the volume of business. We quote gross tons, Cleveland delivery, as follows:

Old iron rails	$20 00 to 21 00
Old steel rails (over 6 feet)	14 50 to 15 50
Old steel rails (under 6 feet)	14 50 to 15 50
Old car wheels	15 00 to 16 00
Steel boiler plate	12 00 to 13 00
Steel axles	15 50 to 16 50
Malleable iron (railroad)	15 00 to 16 00
Malleable iron (agricultural)	13 00 to 14 00
Heavy steel	13 50 to 14 50

We quote as follows, net tons:

No. 1 R. R. wrought	14 00 to 15 00
No. 1 busheling	12 00 to 13 00
No. 1 machine cast	12 50 to 13 50
Iron axles	21 00 to 22 00
Axle turnings	10 00 to 11 00
Wrought turnings (free from cast)	9 00 to 10 00
Grate bars	8 00 to 9 00
Pipes and flues	10 00 to 11 00
Tank iron	9 00 to 10 00
Hoop and band iron	7 50 to 8 50
Sheet iron	6 50 to 7 50
Wrought drillings	9 00 to 10 00
Stove plate	9 00 to 10 00
Cast borings	6 75 to 7 75

CINCINNATI.

May 16.

Pig Iron.—Dullness still continues and no sales of importance have been reported. Inquiry is equally light and the situation shows no change. On Southern pig iron $13 Birmingham for No. 2 foundry is now an open quotation and most Southern brands are available at this price. We hear of no quotations, however, below this figure. For Northern iron $15.50 to $15.75 for No. 2 foundry are current quotations. The present price level is largely nominal in the absence of business. The tone of the market is easy and the general situation seems to favor buyers. The trade is now regarding the market carefully and tendencies as to future developments are under discussion. It seems reasonably clear that buyers will continue their waiting policy until present contracts are nearly worked out and that as soon as this takes place inquiry will improve. The question at this juncture is whether under competition for business furnace interests will shade prices or the buying movement will be sufficiently large to stimulate firmer holding and a steadying tendency. In some quarters the monthly statement showing slight increase in furnace stocks is not regarded as a serious detriment to the situation, for it is argued that consumers are using up their stocks steadily and that the depletion of stocks in melters' hands will fully offset the increase in furnace stock. In other words, it is believed that, if figures were obtainable for stocks of pig iron in all hands, a decrease would be shown. The attitude of buyers has not changed and they continue to assert their belief in lower prices later on. Quotations are as follows, f. o. b. Cincinnati:

Southern Foundry No. 1	$16 25 to 16 50
Southern Foundry No. 2	15 75 to 16 00
Southern Foundry No. 3	15 25 to 15 50
Southern Foundry No. 4	15 00 to 15 25
Southern Foundry No. 1, soft	16 25 to 16 50
Southern Foundry No. 2, soft	15 75 to 16 00
Gray Forge	14 75
Northern Foundry No. 1	17 40 to 17 65
Northern Foundry No. 2	16 90 to 17 15
Northern Foundry No. 3	16 40 to 16 65
Southern Charcoal	19 25 to 19 50

Finished Material.—The market shows no change and the demand for steel product in a jobbing way continues active and mills are behind in their orders. Bar iron is rather quiet but not quotably changed. Bar iron is quoted at 1.60c; steel bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets at 75 and 7½ per cent off. We quote black sheets, No. 27, at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.20c; No. 14, 2.10c; No. 12, 2.05c; No. 10, 2c. Tank plates are firm and sell out of store at 2c for ¼-in. and 2.10c for 3-16, No. 8 and No. 10. Beams and channels are quoted at 2c from stock and angles at 2c to 2.05c for base sizes.

Merchant pipe continues in fair demand and steady in tone. The leading interest is strictly maintaining its schedule with quotations as follows, f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ and ¼ inches	65.35	49.35	63.35	47.35
⅜ and ½ inches	69.35	57.35	67.35	55.35
¾ to 6 inches	73.35	63.35	75.85	61.85
7 to 12 inches	68.35	53.35	66.85	51.35

Old Material.—Sellers are offering urgently and the market is weaker and lower on some descriptions. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$15 00 to 15 50
Cast machine and foundry, net tons	11 00 to 12 00
Old iron rails, gross tons	19 00 to 19 50
Old steel rails, gross tons	15 00 to 15 50
Old short lengths, gross tons	13 50 to 15 00
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	8 50 to 9 00
Wrought turnings, net tons	10 50 to 11 00
Cast borings, net tons	7 50 to 8 00
Car wheels, net tons	15 00 to 15 50

Coke.—There is but little doing and the market is dull and easy. Furnace coke on contract is quoted at $1.85 and foundry coke at $2.50 on contracts f. o. b. Connellsville.

PHILADELPHIA.

May 16.

The iron and steel market has developed a state of masterly inactivity, so far as new business in pig iron is concerned, and many well informed persons expect no great change before the end of June. By that time requirements for the second half of the year can be better gauged by those who have not ordered far ahead, and the production of pig iron will at the same time, it is believed, be somewhat reduced from its present record-breaking pace by the necessity of repairing many furnaces and taking breath after the strenuous exertions of the past six months. In the meantime the output of finished material shows no diminution in the most important lines, the demand for plates, bars and structural material being especially heavy. While the general feeling is not so optimistic as it was a few weeks ago, the situation may be described as not discouraging from the standpoint of those who prefer a steady and well sustained trade at fair prices rather than a runaway market.

Pig Iron.—New business is very scarce, and in order to secure what little is offering sellers are willing to make concessions. These do not often exceed 25 cents a ton, however. Furnaces generally are so well supplied with orders that no necessity exists for any further reduction. This condition is expected to last well into June. There seems to be general recognition of the fact that a production of 2,000,000 tons a month is in excess of the country's real consumption and that there must be a readjustment of the supply to the demand. Until that is done little new business is looked for. In the meantime the following prices may be quoted:

No. 1X Foundry	$18 00 to 18 25
No. 2X Foundry	17 50 to 17 75
No. 2 Plain	16 75 to 17 00
Standard Gray Forge	16 00 to 16 25
Ordinary Gray Forge	15 25 to 15 50
Basic	16 75 to 17 00
Low phosphorus	20 75 to 21 00

Finished Material.—While a diminished demand is reported in some lines, notably steel and iron bars and sheets, the orders for structural material and plates show no apparent let up, and the mills continue very busy. Premiums are still asked for anything like prompt delivery. Schedule prices remain unchanged as follows: Beams, channels and angles, according to specifications, 1.73½c to 1.85c; refined iron bars, 1.73½c to 1.80c; steel bars, 1.63½c to 1.70c; plates, 1.73½c to 1.80c.

Old Material.—In the absence of sales the market is naturally dull and prices purely nominal. There are reports of a further drop of a dollar or so a ton in some lines, while on the other hand dealers assert that this is merely a case of the wish being father to the thought and that there is no record of any such sales. Certain it is that the mills show little disposition to buy and that sellers prefer holding their material to making further cuts. Prices may therefore be quoted the same as last week, as follows:

Old steel rails	$16 00 to 16 50
No. 1 steel scrap	16 00 to 16 50
Old steel axles	20 50 to 21 50
Old iron axles	23 75 to 24 75
Old iron rails	21 50 to 22 50
Old car wheels	15 00 to 16 00
Choice scrap, R. R. No. 1 wrought	19 50 to 20 00
No. 1 yard scrap	17 50 to 18 00
Machinery scrap	15 00 to 15 50
Low phosphorus scrap	21 50 to 22 00
Wrought iron pipe	15 00 to 15 50
No. 1 forge fire scrap	15 25 to 15 75
No. 2 forge fire scrap, ordinary	11 50 to 12 00
Wrought turnings	13 50 to 14 00
Axle turnings, heavy	15 00 to 16 00
Cast borings	10 00 to 11 00
Stove plates	11 00 to 12 00

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., May 16.

Pig Iron.—There was a further recession in prices in the local pig iron market during the past week, for which the little business that was going and the keen competition for it were responsible. Eastern Pennsylvania furnaces, which have been stoutly resisting for weeks every attempt to depress prices, have been forced to take cognizance of existing market condi-

tions, and as a result are selling No. 2 foundry on the basis of $16 at the furnace. Some interests, however, still hold out for $16.25, but at the sacrifice of orders. In Southern irons the market bore a decidedly weak aspect, and there is no longer any doubt about the ability to place orders on the basis of $13 Birmingham for No. 2 foundry. As the market stands at this writing it is easier to buy than sell at this figure All present quotations for both Northern and Southern irons apply to orders that call for delivery the balance of the year, but yet buyers do not seem inclined to make provision to any extent for their requirements for that period. The conviction is growing weekly that the majority of consumers have contracted for all the iron they will need up to July 1, and some beyond that time, and it is believed here that the market in the meantime will be quiet, with prices showing no decided changes one way or the other. New York quotations at tidewater follow: Northern No. 1 foundry $17 to $17.50; No. 2 foundry, $16.50 to $17; No. 2 plain, $16 to $16.50; No. 1 Southern foundry, $17 to $17.50; No. 2 foundry, $16.50 to $17; No. 3 foundry, $16 to $16.50; No. 4 foundry, $15.50 to $16. Foundry pig iron warrants follow:

	Bid.	Asked.
May	$15.50	$16.25
June	15.50	16.25
July	15.50	16.25
October	15.50	16.25

Finished Iron and Steel.—There were no orders of magnitude placed in structural shapes during the past week, but small orders closed made up an excellent tonnage. The American Bridge Co. booked small orders for about 12,000 tons, and expects that its total tonnage for this month will approximate 70,000. The bids for the foundations for the new Pennsylvania station in this city, which we noted some time ago, and involving about 21,000 tons, went in on Saturday. The order for the steel that will be required for the superstructure, and which will amount to about 40,000 tons more, will be placed in a few weeks. There continues to be a good business in plates, with small lots the rule. In bars and sheets general conditions show no change. We quote New York prices at tidewater: Angles, 3 to 6 in. x ¼ in. and heavier, 1.74½c; beams, 3 to 15 in., 1.74½c; channels, 3 to 15 in., 1.74½c; beams, 18, 20 and 24 in., 1.84½c; tees, 3 x ¼ in. and heavier, 1.79½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine and ordinary firebox, 1.94½c; refined iron bars, 1.64½c; soft steel bars, 1.64½c to 1.67c; sheets, in carload lots, New York, No. 28, black, 2.50c to 2.55c; galvanized, 3.60c to 3.70c.

Old Material.—During the week the local market was in a state of demoralization, and as a result reliable quotations are difficult to obtain. There is considerable material waiting for a market, and the outlook, therefore, is thought to indicate lower prices. Trading is very quiet. Quotations approximately f. o. b. New York follow:

Old iron rails	$20 00 to 22 00
Old steel rails, long lengths	15 50 to 16 50
Old steel rails, short pieces	14 50 to 15 00
Relaying rails	20 00 to 21 00
Old car wheels	15 50 to 16 50
Old iron car axles	21 75 to 22 75
Old steel car axles	18 00 to 19 00
Heavy melting steel scrap	14 50 to 15 50
No. 1 railroad wrought scrap	18 75 to 19 50
Iron track scrap	17 00 to 18 00
Wrought pipe	13 50 to 14 50
Ordinary light iron	9 50 to 10 50
Cast borings	8 00 to 8 50
Wrought turnings	11 50 to 12 50
No. 1 machinery cast	14 50 to 15 25
Stove plate	12 00 to 13 00

BIRMINGHAM.

May 16.

Alabama furnacemen are beginning to feel the dull iron market and there is some iron accumulating in this district. There appears to be no apprehension, however, as to the future, the statement being made that orders are on hand which will require a steady production for about 60 days and in the meantime it is believed that a decided change will have come on the market. Considerable iron has been sold now below $13.50 for No. 2 foundry iron, though two or three of the Alabama manufacturers are not seeking business. The Tennessee Coal, Iron & Railroad Co. has blown out its Little Belle furnace at Bessemer on account of a short supply of coke. The furnaces at Ensley manufacturing basic iron are given every attention and as soon as it is found that coke and other material is needed at this plant other furnaces are allowed to suffer.

No definite date has been fixed for the blowing in of the new furnace of the Woodward Iron Co. The little furnace of the Williamson Iron Co. (Dimmick Pipe Co.) will be ready between the 20th and 25th inst.

Quotations given now in Alabama place No. 1 foundry between $13.50 and $13.75; No. 2 foundry, $13 to $13.25; No. 3 foundry, $12.50; No. 4 foundry, $12; gray forge, $11.50; No. 1 soft, $13.50 to $13.75; No. 2 soft, $13 to $13.25.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review,*
ROOM 1315, NO. 150 NASSAU ST., May 16.

Pig Tin.—The reactionary tendency in prices noted in our last report continued during the week under review, the declines averaging about ½ cent. There is nothing to indicate any improvement in the market in the near future, and a dull summer with lower prices is considered likely. In London the market has been dull and lower. Today's closings follow: Spot, 29.75c to 29.90c; May, 29.62½c to 29.87½c; June, 29.40c to 29.75c; July, 29.25c to 29.50c. London's closing today follow: Spot, £135 5s; futures, £134 5s. Arrivals at Atlantic ports for the month to date aggregate 1,555 tons, with 1,610 tons afloat.

Copper.—There has been no development of interest in the local market during the week, and prices remained unchanged. As the trade situation stands now, the dullness which prevails looks like a fixture for the near future anyway. The London market has been quiet, with prices £1 lower, and with spot and futures on a parity. Today's closings follow: Lake and electrolytic, 15c nominal; casting, 14¾c nominal. London's closings to day follow: Spot and futures, £64 10s. Exports for the month to date amount to 5,790 tons.

Lead.—Spot is quiet and unchanged, selling at 4.50c to 4.60c. St. Louis is a trifle lower at 4.45c. London is firm at £12 17s 6d.

Spelter.—There has been continued weakness in spot, which now commands 5.50c to 5.60c. St. Louis declined to 5.30c. London is firm at £23 12s 6d.

Antimony.—All grades are extremely firm, and for the first time in many months are quoted alike, being 8.75c to 9c.

Quicksilver.—We quote $38 per flask of 75 lb. lots of 100 flasks. London is £7 7s 6d.

CHICAGO.

OFFICE OF *The Iron Trade Review,*
1164 MONADNOCK BLOCK, May 16.

Further weakness is noted in metals as a result of the slight demand. Copper is off ⅛ of a cent, spelter ¼ of a cent, and pig tin ¼ of a cent. We quote lake, 15c for carload lots, and 15¼c for less than carload lots. Casting copper, 14⅞c for carload lots, and 15c for less than carload lots. Spelter, 5⅝c for carload lots, and 6c for lesser quantities. Sheet zinc is without change at 7¼c for carload lots of 600-lb. casks, and 7½c for less than carload lots. Pig tin, 30½c for carload lots, and 31c for less than carload lots. Pig lead, 4.45c for 50-ton lots, 4.50c for carload lots and 4.55c for less than carload lots. Antimony, both Cookson's and Hallett's, is quoted at 9½c.

There is very little demand for old metals and prices are lower than a week ago. Dealers' quotations are approximately as follows: Copper wire, 13c; heavy copper, 12c; light copper, 11c; red brass, 11c; red brass borings, 9c; yellow brass, 8c; yellow brass borings, 7c. Pipe lead, 4c. Tea lead, 3.60c. Zinc, 4.15c.

The Labor Situation.

AMALGAMATED ASSOCIATION CONVENTION.

(Special Telegram.)

DETROIT, MICH., May 17.—The Amalgamated Association of Iron, Steel and Tin Workers, in session today, decided to request a restoration of the 1903-04 tin mill scale and not to ask for an advance over 1903-04 scale on the sheet mill hand scale. On the large sheet and jobbing scale a restoration of the 1903-04 scale will be asked.

All local scales were left to be settled by the local organizations in the various districts. President Schaffer returned from Wheeling, W. Va., and reported that in his opinion the difficulties at the Whitaker-Glessner plant would be satisfactorily adjusted. The entire plant is now closed down and the non-union men have left. When the plant starts it is reported the old men will return to their places.

The election of officers will take place Friday. The meeting place for the next convention has not been decided. President Schaffer recommended organization of the negro iron and steel workers of the South and said their admission into the association would solidify the association and go a long way toward eliminating the differences which now exist between the white and negro workers.

METAL TRADES ASSOCIATION NOTES.

On Thursday, May 18, the Cincinnati Metal Trades Association will hold its annual meeting in the banquet room of the Odd Fellows' Temple at 8 p. m. After the meeting a buffet luncheon will be served. The principal business to come before the meeting will be the annual election of officers and the question of the merging of the local association into the national.

A well attended meeting of foundrymen was held on Wednesday evening, May 10, in New York City and as a result a permanent organization was completed, known as the "New York and New Jersey Foundrymen's Association." The following officers were elected: J. F. Arnold, of Smead & Co. Iron Works, president; Lawrence Fagin, Fagin Iron Works, vice president; Francis D. Jackson, of the Hecla Iron Works, treasurer; Henry C. Hunter, secretary. The executive committee consists of these officers and John J. Riley and John Ferguson, of F. Ferguson & Sons. The present membership consists of a large majority of the principal foundries in and about New York City and practically all the foundries in that district have expressed their approval of the association and their intention to join it. The first subject to engage the attention of the new association is the demand of the International Brotherhood of Foundry Employes for an increase in wages, the employment of only such employes as are members of the brotherhood or such as will sign an application for membership in the brotherhood; the discharge of expelled or suspended members of the brotherhood and the privilege of the walking delegate to visit the shops to transact union business.

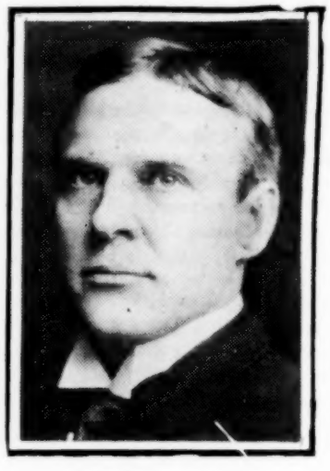
PUDDLERS' WAGES ADVANCED.

The bi-monthly adjustment of the bar iron scale was made in Youngstown, O., on Saturday, May 13, and it was found that the average selling price of iron during the months of March and April was 1.5c a pound. The puddlers accordingly receive an advance of 25 cents a ton during the months of May and June and will be paid at the rate of $5.37½ a ton. The finishing rate is as follows: Heater, 61 6-10 cents; roller, 42½ cents; catcher, 27.7 cents; rougher down, 18.8 cents; rougher up, 15.7 cents a ton.

George L. Fordyce, of Youngstown, O., representing a syndicate, is endeavoring to purchase the plant of the Penn Shovel Works at Warren, O., which recently went into receivership. It is probable that the plant will be sold by private sale at two-thirds its appraised value.

OBITUARY.

Sir Bernhard Samuelson, a member of the Iron & Steel Institute, and from 1883 to 1885 its president, died at his home in London May 10. He was born on Nov. 22, 1820, the son of a Liverpool merchant. When he came of age he was sent to France as the representative of an engineering firm and established the railroad works at Tours. In 1849 he purchased agricultural works at Banbury, Eng., and in connection with them erected blast furnaces at Middlesbrough. In 1859 he was made member of Parliament for Banbury, and also served from 1865 to 1885, in the latter year being elected for North Oxfordshire, which he represented for ten years. He was chairman of the Royal Commission on technical education and of the Association of Chambers of Commerce. He was knighted for services to technical education in 1884. His publications include various reports on technical subjects to the House of Commons, "Railway Rates in This Country and on the Continent" and "Navigation and Conservancy of the Upper Thames." He was a fellow of the Royal Society and a knight of the Legion of Honor of France.



JAMES R. PHILLIPS.

James R. Phillips, president of the recently organized Phillips Sheet & Tin Plate Co., of Clarksburg, W. Va., which purchased the plant of the Clarksburg Sheet & Tin Plate Co., met his death in the Pennsylvania railroad wreck which occurred near Harrisburg, Pa., early Thursday morning, May 11. Deceased was a resident of Pittsburg and until recently was Pittsburg district manager of the plants of the American Sheet & Tin Plate Co. He had a wide experience in the manufacture of sheets and tin plate and was returning from a short trip to New York in connection with his new venture when he met his death. He had intended removing in a short time to Clarksburg, where his new interests are located.

Samuel P. Harbison, chairman of the board of directors of the Harbison-Walker Refractories Co., of Pittsburg, died at his home in Allegheny on Wednesday, May 10. Deceased has been one of the most prominent factors in the fire brick business of the country for more than thirty years and was one of the promoters of the Harbison-Walker Refractories Co., a consolidation of a large number of the fire brick plants in Ohio and Pennsylvania. He was born in Allegheny County in 1840 and in 1872 the partnership of Reid & Harbison was formed to engage in the manufacture of fire brick. The year following, Mr. Reid gave way to Hebberton Walker and the firm became known as the Harbison-Walker Fire Brick Co. Several years ago it was merged with the Harbison-Walker Refractories Co. Mr. Harbison was well known in Pittsburg financial circles and contributed largely to charity in a quiet way. He is survived by his wife and two sons.

Victor L. Crabbe, assistant manager of the mills of the Carbon Steel Co., Pittsburg, is another victim of the Pennsylvania railroad wreck of May 11. He was born in Wooster, O., Oct. 2, 1867, and was educated in the public schools of that place. After graduating from high school, he entered Wooster University, graduating in 1864. Shortly after his graduation, he came to Pittsburg and accepted a professorship under his brother at Shadyside Academy, and fifteen years ago he entered the employ of the Carbon Steel Co. He rose rapidly and some years ago was appointed assistant manager.

SCHOEN STEEL WHEEL CO.

(Special Telegram.)

PITTSBURG, May 17.—The Schoen Steel Wheel Co., whose plant is located at McKees Rocks, Pa., has plans prepared for doubling the capacity of its plant at a cost close to $200,000. The plant at present has an output of about 100 wheels daily and this will be increased to 250 wheels. A steel building 390 x 80 ft. will be built, the contract for which will be awarded this week. Three presses are to be added, the one to be of 7,000 tons capacity and a line pressure of 5,000 pounds to the sq. in. This press will be the largest in the country outside of those used in armor plate plants. The press now in operation at the company's plant has a capacity of 5,000 tons. The other two presses will be able to exert a pressure of 1,200 tons each and will be used for coning and punching. The Chambersburg Engineering Co., Chambersburg, Pa., has received the contract for the presses. Two heating furnace of the regenerative type will also be installed and will be built by William Swindell & Bros., of this city. They will have a capacity of 16 blanks each. Manipulators for charging and withdrawing the blanks will also be installed. The boiler capacity will be doubled by the addition of 750 h. p. and pumps and accumulators to serve the presses are also to be installed.

These rolled wheels are now in service on 25 different railroads and the Brooklyn Rapid Transit has 3,000 in use. In a recent test to which a wheel was subjected it was given 60 blows, 36 on the rim and 24 on the hub, and the deflection was less than 1-100 of an inch. The wheel showed no indications of a crack. The drop weighed 1,800 pounds and was from a height of 12 ft. The blanks from which the wheels are made come in the shape of slabs from 3½ to 5 in. thick and are of open-hearth steel. Tests thus far show that the wearing qualities surpass those of the steel tired wheel.

The Jupiter furnace, St. Louis, Mo., has been nearly dismantled, and will be moved to the Gadsden, Ala. district. The National Furnace Co., will control the new furnace. J. M. Elliott Jr., is president of the company.

George A. Dickson, who has had a wide experience in the sale of pipe and tubing, has been appointed general sales agent of the Seamless Tube Co. of America, Pittsburg. This company's plant is located at Monessen, Pa., and was recently placed in operation manufacturing seamless wrought steel tubes for locomotive, marine, water tube and high pressure tubular boilers by the Briede process. I. W. Bollinger, 36 La Salle street, Chicago, has been appointed head of the Western sales department; Chas. E. McInnes & Co., 1733 Land Title building, Philadelphia, will have charge of sales in the Philadelphia territory and Pierson & Co., 29 Broadway, New York, have charge of the Eastern sales department.

In the tables given in *The Iron Trade Review* of May 11, in connection with the paper of James Gayley on "Dry Air Blast in Iron Manufacture," an error was made in the statement of coke consumption in the operation of No. 1 Isabella furnace from Jan. 1 to Jan. 10, 1905. The average coke consumption per ton of iron produced was 1,825 lb. instead of 2,078 lb., this figure comparing with 2,340 lb. per ton of iron in the period Jan. 15-31, when normal blast was used.

The H. C. Frick Coke Co., Pittsburg, will erect machine and car repair shops at all its coke plants in the upper Connellsville region. The shops will all be 30 x 66 ft. and will be equipped with machinery for making all necessary repairs to mine cars, mining and coke works equipment.

The National Association of Stove Manufacturers, before closing its annual convention at Chicago, selected New York as the next meeting place. The new officers are: President, W. P. Warren, Troy N. Y.; vice presidents, W. G. Henry, Chicago, and W. J. Myers, New York; treasurer, R. L. Morley, Chicago; general secretary, Thomas J. Hogan, Chicago; board of managers: George Dana, St. Louis; E. W. Anthony, Boston; C. A. Du Charme, Detroit; Ed. W. Bowditch, Albany; N. H. Burt, Leavenworth.

Blast Furnace Operations in Virginia.

Low Moor Iron Co., of Virginia, has just started its small furnace at Low Moor. The large skip furnace at that plant went out two weeks ago, the lining having burnt out. This company is making repairs to its Covington, Va., furnace with a view to starting it in the near future.

Princess furnace, at Glen Wilton, Va., is making about 50 tons of foundry iron a day for the trade.

The three furnaces of the Alleghany Ore & Iron Co. are making about 9,000 to 10,000 tons of iron a month—basic, car wheel and foundry. This company is mining about 20,000 tons of ore a month. Its Oriskany brown ore mine is producing 15,000 tons of 47 percent ore a month. This is a steam shovel proposition, and we believe is the largest single producing brown ore mine in the United States. The entire tonnage passes through one washer and comes from one mine.

Goshen furnace of the Chapman Iron, Coal & Coke Co., is undergoing repairs. It will be in blast in a few weeks. The Rich Patch mines of the company are making a large output. Recent improvements at these mines, installation of jigs, etc., has raised this ore to a high grade.

At Berryville, Va., on the N. & W. R. R., iron mines are being opened by Baltimore people. The ore is a high grade brown hematite and there is a large body opened up. This will be a steam shovel proposition shortly. The ore is on top of the ground and cheaply mined.

PITTSBURG, May 17.—The Girard Boiler Co., Girard, O., has received an order for 6,000 tons of riveted pipe for St. Louis. About 5,000 tons of plates will be required, but the order has not been placed.

Figures given out as to steel billets and steel rails shipped during the month of April from the Birmingham district give the amount at 21,924 tons, of which 14,854 tons went into steel rails. The Birmingham district is credited with shipping 7,688 tons of cast iron pipe out of a total of 17,765 sent out of the Southern territory. The Birmingham district also shipped 74,816 tons of pig iron in April, out of a total of 136,966 tons from the territory. The cast iron pipe works in Alabama are shipping their product about as rapidly as they can make it. The United States Cast Iron Pipe & Foundry Co. is shipping iron pipe in all directions, good orders recently having been secured from St. Louis. The New Orleans order is still to be delivered on and will be for some weeks yet to come. The Dimmick Pipe Co. is pushing its improvements and will be able in the next few weeks to increase production.

D. B. Doty has been appointed receiver for the Columbia Drilling & Mfg. Co., New Kensington, Pa., manufacturer of drilling machines for oil, gas and water wells. The company is capitalized at $50,000, of which $40,700 has been paid in. The appraised value of the property is $90,000, while the indebtedness amounts to $53,000. It is admitted that the company has not been operated at a profit on account of mismanagement and limited capital.

Directors of the Tennessee Coal, Iron & Railroad Co. organized on May 16 for the ensuing year. Don H. Bacon was re-elected president and chairman of the board; F. S. Witherbee was elected first vice president, and L. T. Beecher, formerly secretary and treasurer, was elected director and second vice president. L. Hoover, formerly auditor, succeeds Mr. Beecher as secretary and treasurer; W. D. Truesdale, assistant auditor, succeeds Mr. Hoover as auditor. H. R. Sloat, who was replaced on the board by Mr. Beecher, was elected assistant secretary and treasurer.

NATIONAL ASSOCIATION OF MANUFACTURERS.

ATLANTA, GA., May 16.—The National Association of Manufacturers began its tenth annual convention in this city today, with a large number of members present representing most of the states of the Union. The addresses of welcome by Gov. J. M. Terrell, of Georgia, Mayor James G. Woodward, of Atlanta, and John Temple Gates, of Atlanta, were noteworthy features of the opening session, as was the annual address of President D. M. Parry. The tendency toward socialism was the factor in modern American life to which the speaker directed attention at the outset. He considered this a portent of coming evil, as it is reflected by the press, by public men and by recent legislative enactments. The agitation for supplanting private control of capital shows two methods for the accomplishment of its object: One, that of confiscation—the passage of legislative enactments and the adoption of other means to reduce profits and to limit private management of capital; the other that of acquiring government control through purchase from the present individual owners. After discussing the question at length, the speaker urged as the most effective and permanent method of meeting the issue of socialism, that of educational propaganda. He considers that the National Association of manufacturers is at the present time the greatest bulwark of individualism in the country.

The Labor Situation.

President Parry found something to commend in the record of organized labor in the past year in that "the efforts to fix arbitrary wages and hours by demonstration of physical power were less in number and less offensive to a proper regard for law and order" than before. "I am sure that all the friends of good government and of labor itself will gladly give organized labor full credit for this improvement in its record. It cannot be expected that complete reformation can be worked in the methods and theories of organized labor in a few months, or even, perhaps, in a few years, but if steady progress can be made toward such reformation not only are all the people to be congratulated, but particularly that portion of the people belonging to organized labor."

Extraordinary progress was made by the open-shop movement during the year, the speaker estimating that fully 1,500 concerns employing labor had changed from the closed to the open shop. "The movement was greatly assisted by several notable court decisions in which it was held that closed-shop agreements were illegal and void. The courts have never, to my knowledge, upheld the closed shop, and I do not think they ever will. They will not do so, at any rate, until the Constitution of the United States is radically changed."

The machinery of the National Association of Manufacturers had been utilized effectively, it was explained, in securing the defeat of the eight-hour and anti-injunction bills at Washington within the year. Local and state associations had been very effective also in opposing ill-considered and socialistic measures brought before the various legislatures.

Coming to the discussion of interstate commerce legislation, President Parry explained the attitude of the association toward the Esch-Townsend bill which passed the last House. The association took no active part in the discussion of railroad rate legislation, as the proposition to have a government commission fix freight rates had never been a subject of earnest consideration by the association. A resolution was passed at the Pittsburg convention last year, endorsing the Quarles-Cooper bill, which at that time met the views of those who demanded railroad legislation, it being the understanding of many that this bill was in line with laws already existing to prevent discriminating rates, and its full significance as a measure authorizing the fixing of rates by the government was not developed in the consideration of the resolution. President Parry expressed the opinion that neither the Esch-Townsend bill nor any other measure which proposes to substitute the inflexible legal rate for the rate determined by competition, should be favored. "The Esch-Townsend bill means that if one section of the country can dominate the commission the other sections can be ruined industrially."

Further, the speaker expressed doubt whether ratemaking laws would lower rates in the future. He said that what the shippers of this country want rather than lower rates is impartial rates, and that unjust discriminations between localities should be corrected.

President Parry also questioned the wisdom of the "stand pat" tariff policy, but advocated a system of reciprocity to build up the sales of manufactured goods abroad. On this point he said:

"This association has in the past declared itself in favor of reciprocity, but the reciprocity it has favored has been rather that of the kind which offers concessions for non-competitive articles alone. As it is frequently stated, it is reciprocity which does not injuriously affect any home industry. Now, in my opinion, such reciprocity means practically no reciprocity at all, for the range of article produced abroad which can not be produced here, aside from the natural products of the tropics, is very narrow. Inasmuch as it is not reasonable to expect that we can obtain something for nothing, and as reciprocity implies concessions by both sides for their mutual benefit, I believe that the position of the association on reciprocity could well be modified. The necessity of enlarging the foreign market for our growing industries is of paramount importance, and as the protective principle is only valid as a means for advancing the general welfare it can not properly be invoked to defeat reciprocal treaties which secure gains for our foreign trade far in excess of possible losses in the home trade."

The report of the patent committee urged that the association adopt a resolution urging upon Congress the importance of the establishment of a Patent Court of Appeals. Two bills looking to this end and differing only in detail were before the 58th Congress. It is thought that the failure to pass one or the other of these was due largely to the conflicting views of their supporters. It is believed that if the manufacturers of the country urge strongly upon Congress the need of the proposed court, the various organizations can be harmonized and legislation secured. It was also suggested that Congress be urged to provide for the patent office increased appropriations sufficient to permit an increase in the examining corps, the publication of abridgements of subject matter indices which are seriously needed, an increase of the patent office library, and the classification and rearrangement of its subject matter.

The report of the committee on strike insurance gave the results of a canvass of the members of the association on the subject. The number of replies received was 739, and of these 268 were in favor of strike insurance and 185 against, with 286 noncommittal. Three-fourths of the membership did not reply. The report says: "About three-fourths of those who favored strike insurance favored the mutual plan. About 20 percent of those who answered were interested but undecided, and another 20 percent apparently could form no opinion whatever. One hundred and forty-nine firms were ready to apply for $12,756,000 of strike insurance, upon the plan suggested by the circular of Dec. 15, 1904. Of this number 80 had experienced strikes within the last five years, and 69 had not. Moreover, certain industries employing machinists, molders and brass workers showed a much higher percentage of strikes than other industries. We conclude that at the outset there would be likelihood of a higher loss ratio than shown by Carroll D. Wright's reports; for the reason that policies would probably be taken out by firms engaged in business of high strike hazard more than by those exposed to but an average risk. Nevertheless, we do not think the loss ratio would be so high as to be prohibitive."

The committee's recommendation is as follows: "In view of the limited number of members desiring insurance, your committee do not recommend to the National Association of Manufacturers at the present time the creation of a strike insurance bureau. We do recommend, however, that the committee be continued for another year, and that we be instructed to obtain permission of the individual members who have indicated a desire for strike insurance to use their correspondence for the purpose of securing the most favorable competitive propositions obtainable from responsible insurers, thereby furthering the actual writing of strike insurance. We make this recommendation in the conviction that the spread of strike insurance must necessarily benefit not only the insured but the entire community."

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE PENTON PUBLISHING CO.

CLEVELAND, OHIO.

CHICAGO - - - - - - 1164 Monadnock Block.
PITTSBURG - - - - - - 429 Park Building.
NEW YORK - - - - - - - 150 Nassau St.

Subscription, $3.00 per annum. To Foreign Countries, $4.50.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

MAY 18, 1905.

THE SHEET AND TIN PLATE SITUATION.

The large attendance of independent sheet and tin plate manufacturers at the meeting in Pittsburg last week, called to discuss a consolidation project, would hardly have been brought out had the subject been broached at an earlier period. No secret is made of the fact that the latest developments in the sheet and tin plate market have not been reassuring to the independents. There has been a decided change in the selling policy of the leading interest in sheets and tin plates which in the immediate future is likely to work to the disadvantage of the independents. There is no ground for assuming that the advantage of the leading interest is a permanent one, the evidence rather being that it is a temporary condition.

It has formerly been the practice in the sheet and tin plate trades to sell definite tonnages, for definite deliveries, and at predetermined prices. In the case of many large buyers it would appear that in the past six months the leading interest has made contracts permitting of more or less flexibility, and putting it in the position of protecting the buyer against all market contingencies. The latter has thus been able to specify more or less heavily, as he desired, and, if a jobber, to meet whatever prices were necessary in order to distribute the goods.

On the steadily rising market of the winter and early spring the working out of this system was to the advantage of independent mills. They had not sold so far ahead, and the advances made in official prices, which were chiefly for the protection of the customers of the leading interest, incidentally enabled the independent mills to get better prices for their products, which they had not sold ahead so extensively. They have really been competitors of the distributing jobbers.

In a market which now presents more possibilities of decline than advance the position of the independent mill is less favorable. It is more difficult to make sales, and the question of what price should be made presents more room for argument on the part of the buyer than it did a few months ago.

One of the unpleasant subjects to the independent is the matter of guarantee against decline. It is easy for the leading seller to guarantee prices, since the decline would be its own decline. If the independent gives a guarantee, it must be one against a decline by another manufacturer, the leading interest. While the guarantee has never become definitely fixed on the sheet trade, it has on the tin plate trade. The independents in the latter branch seemed to have thought lately that they had eliminated the guarantee, but it is obvious that the case was simply that, in a steadily rising market, the buyer did not bother to have the clause inserted. Now that the possibilities are rather in the opposite direction, it has become evident that the guarantee was merely asleep and not killed. It is being pretty generally insisted upon at the present time.

The most unpalatable feature of the guarantee is its one-sided nature. The mill which guarantees its sales against decline cannot buy its raw materials on the same basis. It must buy its billets or sheet bars at a fixed price, with the possibility of adjustment in only an extreme case.

While the working out of the new policy of the largest producer may have made it a little more difficult at times for the independents to obtain orders, there is no question that it results in the independents, on an average, obtaining better prices for their products than does their large competitor. This has been markedly the case in the past few months, but profits have not been proportionately larger on account of the scarcity of steel. This condition is not necessarily a permanent one. Indeed, it is possible that much of the interest manifested in the meeting last week was due to the conjecture that possibly the Bessemer steel interest which has lately completed a sheet bar mill was behind the promoters. Whether the conjecture be true or not the mill has been built and must necessarily be an influence in the bar situation in the future.

The Cleveland Furnace Co., Cleveland, has blown out its stack for relining. The furnace has been in operation since August, 1903, with the exception of one short shut down.

The Columbus Machine & Foundry Co., of Columbus, O., at a meeting held May 10 elected the following officers and directors: W. C. Richards, president; E. T. Moore, vice president; A. Frederick, superintendent, and E. Hight, secretary. W. C. Richards, E. T. Moore, Joseph Donoghue, Walter Weaver and A. Fredericks were elected directors.

Interests connected with Rogers, Brown & Co., of Cincinnati, have incorporated the Central Pig Iron Warehouse Co. The incorporators are H. E. Turner, president; F. W. Miller, vice president; H. H. Leonard, secretary and treasurer; D. B. Meacham, and J. K. Pollock.

The Penn Bridge Co., Beaver Falls, Pa., whose structural steel plant was recently destroyed by fire, is negotiating for the purchase of the old Shelby steel tube plant at New Castle, Pa., which was later acquired by the Cuyahoga Steel & Wire Co. The site of the plant of the company at Beaver Falls is entirely inadequate and for the purpose of securing more room the effort is being made to acquire this property.

THERMIT IN STEAMBOAT REPAIRS.

The use of thermit for repair work increases as its peculiar advantages become better known. The thermit reaction has been described at length in *The Iron Trade Review* and the general procedure in manipulation is now fairly well understood. The first actual application of thermit to steamboat work on the great lakes took place at Sault Ste Marie, Mich., May 1, when the rudder shoe of the tug S. C. Schenck was welded. The only other marine work on the lakes to which thermit has been applied was on two anchor stocks as tests at Chicago three months ago.

The tug Schenck, owned by the Great Lakes Towing Co., backed on the rocks at the Dyke, St. Mary's river, last fall and lost the rudder shoe and rudder, rendering the tug helpless. There is no blacksmith shop in that part of the

FIG. 1.—THE MOLD AND CRUCIBLE READY FOR THE THERMIT WELD.

country at which the damage could be repaired and by ordinary methods the plating would have to be loosened and the stern post taken out.

The Schenck was pulled out on a marine railway, the shoe and rudder recovered from the bottom of the river, wheel taken off and thermit applied to weld the break. A crucible containing 125 lb. was used, the weld was perfectly successful and the boat is in commission, a large amount of time and money being saved the owners.

The fire at the plant of the Stockton Iron Works, Stockton, Cal., April 19, was confined within the walls of the three-story brick pattern storage building, and did much damage to patterns. The remainder of the plant was not affected, and work in all other departments was resumed the following morning. The work of replacing the lost patterns will be pushed as rapidly as possible.

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, on Wednesday, May 10, at 5 p. m., Vice President W. B. Snow in the chair. The routine business was disposed of in the usual manner and applications for membership were received from the United States Graphite Co., Saginaw, Mich., and Joseph Dixon Crucible Co., Jersey City, N. J. They were unanimously elected.

The chair appointed Messrs. Miller and Stockwell as a committee to look up the matter of transportation to the annual convention of the American Foundrymen's Association to be held in New York City on June 6, 7, and 8.

The quiz topics arranged for discussion were then taken up. Below are given some of the questions and answers:

Ques. What is the best and cheapest method for melting brass and bronze castings?

Ans. We use a Schwartz furnace and melt a ton of clean castings for less than a ton of coal. We do not have any trouble and our crucibles are good. We do not have trouble with blow holes any more than anybody else and our percentage is not so great. We use a very light gate. We pour our machine work just the same as iron.

Ques. Do you use an oil furnace?

Ans. We do not think we could use an oil furnace and get out the work we do.

Ans. For our work we think the old crucible furnaces are better. We use a gas furnace for white metal and aluminum. With our gas furnace we melt aluminum alloy with 90 per cent aluminum. We carry 15 molders all on piece work. The gas furnace we find is very easy to handle and it is very clean.

Ques. What is the best method for molding brass and bronze castings?

Ans. We are making considerable work on the molding machine. We get quite a good size gate of small work in a flask 10 x 18 for 2½c per mold. On core work in the same size flask we pay 3½c per mold, and for a flask that has 50 cores, 5c per mold. Our loose work is very difficult. That is, the general run of electrical work is crooked and we pay 9¾c. Our work is all piece work, and it must be perfect, first class work.

Ans. We run machines on our valves and pay 3c per mold. Of course, the bigger the pieces are the more we have to pay. We melt in a Rockwell furnace. If there are no cores in the molds we turn out about 90 molds per day, sometimes 100. If we have cores we get 60 or 70, sometimes 75.

Ques. Have you any special method for drying ladles?

Ans. We use the old method of drying our ladles. That is, we burn wood fires in them. We have plenty of old wood in the yard that would otherwise be going to waste.

Ans. We have a large room behind the cupolas with a tramway between the cupolas, and the ladles are run in on this tramway. There is a special arrangement of a frame with an iron hood over each ladle which covers the same, leaving room, of course, for a draft for the fire, and this hood is connected to a smoke pipe that carries away the smoke, etc. We burn wood fires to dry the ladles and find they do it very quickly and satisfactorily.

After a short intermission the meeting adjourned to dinner, after which the chairman introduced as the speaker of the evening Mr. M. McNaughton, of the Joseph Dixon Crucible Co., who addressed those present on the subject: "Graphite and Facings." At the conclusion of his remarks a unanimous vote of thanks was extended to Mr. McNaughton.

Announcement was made that the June meeting would be an outing and that full particulars would be mailed to the members later.

Those in Attendance.

M. McNaughton, Jos. Dixon Crucible Co.
W. B. Snow, B. F. Sturtevant Co.
J. N. Scovil, Geo. W. Stafford Co.

A. J. Miller, Whitehead Bros. Co.
Geo. H. Lincoln, G. H. Lincoln & Co.
B. M. Shaw, Walker-Pratt Mfg. Co.
G. H. Gibby, Gibby Foundry Co.
F. F. Stockwell, Barbour-Stockwell Co.
J. O. Henshaw and C. A. Reed, N. S. Bartlett & Co.
A. L. Haasis, Jos. Dixon Crucible Co.
J. M. Darke, T. E. Stevens and E. H. Kelley, General Electric Co.
D. L. Moody and H. S. Phelps, Rogers, Brown & Co.
J. A. Holfelder, Kellogg-McCrown-Howell Co.
L. S. Brown and W. H. Coffin, Springfield Facing Co.
E. C. Peck, United States Graphite Co.
E. J. Lyons, Brown & Sharpe Mfg. Co.
F. A. Hoyt, S. M. Thompson, R. H. Penney and T. C. Wilson, Barbour-Stockwell Co.
F. J. Stewart, Jas. Stewart & Co.
C. Hitch, Jr., American Tool & Machine Co.
E. S. Decker and W. H. Stafford, Gibby Foundry Co.
Geo. O. Sawyer, Hartford Laboratory Co.
H. E. Gibby, Mechanics Foundry Co.
G. A. Locke and A. B. Herrick, Smith & Wallace Co.
E. V. Hazard, Old Colony Foundry Co.
H. A. Carpenter and L. N. Perrault, A. Carpenter & Sons Fdy. Co.
Chas. E. Fouhy, Boston Labor Bureau.
W. H. Bense, Kinsley Iron & Machine Co.
W. M. Saunders, Saunders & Franklin, Chemists.

Plans for Engineers' Home.

Plans have been filed with Buildings Superintendent Hopper, of New York City, for the new 15-story building, to cost $975,000, which Andrew Carnegie is to present to the Associated Societies of Engineers of New York, of which A. R. Ledoux is president. It is to be erected on the premises No. 25 to 33 West Thirty-ninth street. Adjoining it in the rear and occupying the plot Nos. 32 and 34 West Fortieth street will be the 13-story clubhouse, which is to cost an additional $375,000, and which is also part of Mr. Carnegie's gift to the engineers. The Thirty-ninth street building will be a fireproof structure, 212 feet high, with a frontage of 115 feet and a depth of 88.9 feet. It is to be of the French Renaissance style, and will be lighted by five rows of tall decorated windows, panelled in bronze. The entrance will be adorned with giant doors of decorated bronze, and will be flanked by columns supporting bronze candelabra. Three ornamental balconied doorways, with bronze doors, built just above the entrance cornice will be flanked by statuary, and the roof cornice and its frieze will be supported by a series of engaged columns and pilasters rising from the thirteenth story. The facade is of granite and limestone, trimmed with terra cotta. The main floor of the building is to have a great entrance hall, and opening off it at the corners will be the administration office, the smoking room, the reception room and a writing room. The third and fourth stories will contain an auditorium, with a balcony, and having spacious promenades on the North and South. The fifth floor will be fitted with smaller assembly halls, and the sixth floor will contain a series of lecture rooms. The seventh to the eleventh floor, inclusive, will be devoted to offices as follows: Seventh and eighth floors, associated societies; ninth floor, mining engineers; tenth floor, electrical engineers, and eleventh floor, mechanical engineers. The library will occupy the thirteenth and fourteenth floors. The architect is Herbert D. Hale.

CANADIAN INDUSTRIES.

Toronto, May 16.—British exporters of tin plate continue to complain of being unable to obtain railroad freight rates to points west of Montreal on terms which will enable them to compete with American manufacturers. The Franklin E. Saunders Co. states it has lost an order for 1,500 tons, valued at about £20,000 from a Toronto house on this account, the trade going to an American firm. Inquiry shows that, as previously stated, the regular freight rates are practically the same as last year. The practice of making a specially low rate upon large shipments has been discontinued and the regular tariff is rigidly adhered to, the railways stating the rulings of the Railway Commission will not permit them to make special terms.

The figures for the 10 months ending April 30 of the amounts paid out by the Dominion government in bounties, indicate the rapid increase in the output of the iron and steel industry. The iron and steel bounties during this period amounted to $941,007 as compared with $697,322 for the corresponding period of 1904, an increase of $271,685.

The Ontario government has definitely refused to ratify the agreement made by its predecessor, the Ross administration with the Electrical Development Co., of Ontario, on Jan. 9 last, permitting the company to develop 125,000 extra horse power at Niagara Falls.

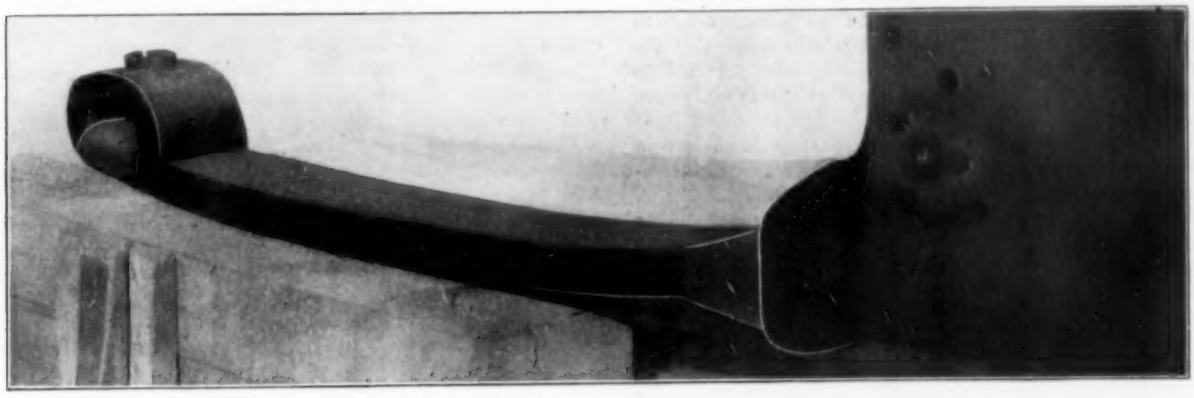


FIG. 2.—THE RUDDER SHOE SHOWING THE WELD.

A large contract is to be let by the Canadian government for wire fencing to be erected along a section of the international boundary of the Northwest. It is intended to put up 100 miles this season and 100 miles next year. Considerable political excitement was created by a statement made in the Ottawa House of Commons that the contract had been privately let without calling for tenders to the firm of McGregor & Banwell, of Walkerville, Ont., at $550 per mile, which was claimed to be an extravagant price. The matter was thoroughly ventilated and it was finally ascertained that the contract had not been actually entered into, though a draft contract at the figure named had been submitted and other firms which might have competed were informed that the contract was let.

The Massey-Harris Co., manufacturer of agricultural implements, etc., is arranging for the construction of a new warehouse in Toronto, to cost $125,000.

The Imperial Steel & Wire Co., of Collingwood, has decided to double the capacity of its plant and will add the requisite machinery at once. It is running night and day turning out about 20 tons of wire every 24 hours, and has large orders ahead, which will keep it busy until July.

The plant of the Northern Iron & Steel Co., of Collingwood, will go into operation in July at latest for the production of railroad material.

The St. Lawrence Engine Co., Limited, has been incorporated under the laws of Ontario, with head office at Brockville, and a capital of $40,000. The provisional directors are: Henry W. Going, Robert H. Smart, Edwin Smart, William H. Comstock and Charles A. McNaughton, all of Brockville.

PROPOSED TIN PLATE AND SHEET CONSOLIDATION.

A meeting was held in Pittsburg Friday, May 12, attended by representatives of nearly all the independent tin plate manufacturers and the majority of the independent sheet manufacturers, to consider plans for the purchase of their plants on a cash basis. Companies were represented operating 82 tin mills and 78 sheet mills. The meeting was called at the instance of M. B. Kelly and Eugene S. Reilly, brokers in iron and steel, who are associated in the American Steel Co. of Pittsburg. The meeting was held at the offices of the Colonial Trust Co. The connection of the trust company with the movement is not defined further than that John C. Chapman, vice president, was called into the meeting for a short time and, upon being asked to express himself, stated that he felt confident that the promoters were financially able to carry out any engagement they made. John C. Reilly, father of Eugene S. Reilly, is a director of the Colonial Trust Co. and is a capitalist of standing in Pittsburg financial cicles.

Eugene S. Reilly acted as chairman of the meeting and M. B. Kelly as secretary, but no minutes are being prepared for those who were in attendance. It was stated that the meeting was called simply to obtain the sentiment of the independent sheet and tin plate operators on the question of consolidation, and whether they would sell their plants on a cash basis, giving fair options therefor, the sellers then being done with the transaction. It was stated, however, that it would be expected that the present management of the various works to be acquired would be retained. It was also stated that the operators, when opinions were obtained, were expected to sign another agreement whereby they would agree not to engage in business for a term of years.

Several of the manufacturers delivered short addresses in which they expressed themselves as favorable to a consolidation. The sentiment in this direction was pronounced. A paper was presented and signed by all but two or three of the manufacturers present, agreeing to give options on their plants by June 1, and to have these options expire in 60 or 90 days. It appears to be the intention to include in the purchases contemplated such finishing plants for sheets and tin plate as are associated with certain of the independent mills, as tinware plants, corrugating plants, etc. In the case of one or two interests having other lines of manufacture, a division of the plant will be difficult, the owners expressed their willingness to sign agreements for the proposed company to act as exclusive selling agents.

The project has been under discussion for some time, and is being widely discussed at present in tin and sheet circles, and one of the chief questions is as to the identity of those back of the movement. It has been suggested that the parties merely are endeavoring to bring about this consolidation for the purpose of offering it to others when formed; that they represent the United States Steel Corporation; that they represent the Republic Iron & Steel Co. or some parties who contemplate the erection of a steel plant and are seeking an assured outlet for their steel.

Some hold quite strongly to the opinion that it is the Republic Iron & Steel Co. that is endeavoring to bring about the consolidation. With its new sheet bar mill in operation, it would be in position to supply all these mills with raw material. It is understood that the company has not sold heavily against the production of the mill which is not yet in operation, and it has been suggested that this might offer some encouragement to the independents to enter a combination of this kind. The feeling of the independents as to the immediate future of the market is not very favorable. This was brought out in conversation at the meeting. The new policy of the leading interest in backing jobbers and consumers as to prices, rather than selling them on the basis of definite tonnages, deliveries and prices, makes the problem of the independents somewhat more difficult.

The independent tin mills represented included all the regularly operative plants except the two connected with enameling concerns at Harrisburg and in the west, and one eastern tin plate interest. There were also represented the following plants, now idle: Clarksburg, Morgantown, Marietta and Greencastle. The sheet mills represented included nearly all the regularly operative interests of the central west.

PERSONAL.

W. H. Coleman has become connected with the Chicago office of B. F. Sturtevant & Co., of Boston, Mass., as manager of blower sales to the foundry trade.

Secretary Taft has accepted an invitation to attend the banquet to be held in connection with the convention of the Southern Hardware Jobbers' Association at Hot Springs, Va., next month.

George J. Chandler, formerly secretary and assistant treasurer of the Cleveland Steel Casting Co., Cleveland, has become associated with the Sterling Steel Foundry Co., Pittsburg, as general sales agent.

George K. Hamfelt, superintendent of the Carrie furnaces of the Carnegie Steel Co. for several years, has tendered his resignation to take effect June 1. John Mohr, chief chemist, has been named as his successor. Samuel Campbell, of Cleveland, has been appointed assistant superintendent of the plant. Mr. Hamfelt has been one of the most successful blast furnace operators among all the Steel Corporation superintendents, his plant always standing near the top or in first place as to cost of operation.

J. B. Miles, of F. C. Roberts & Co., Philadelphia, and Wm. White Jr., of Pittsburg, were among attendants at the meeting of the Iron and Steel Institute at London last week. Andrew Carnegie, in retiring from the presidency of the institute announced a subscription of $25,000 to the research fund founded by him.

At the annual meeting of the Iron and Steel Institute in London last week, a Carnegie research scholarship of $500 was awarded to Henry Cook Boynton, instructor in metallurgy and metallography in Harvard University. Mr. Boynton is the third American to be successful in obtaining this scholarship, two Columbia University men having previously won it. Mr. Boynton is 30 years of age. He entered Harvard University in 1896 and received his A. B. degree in 1900, his S. M. degree in 1901 and his S. D. degree in 1904. His thesis for the doctor's degree dealt with the "Relation Between the Treatment, Structure and Properties of Steel." Since his graduation Mr. Boynton has devoted much time to research work, dealing chiefly with the metallography of iron and steel, and has written several papers on the subject. The present scholarship will make possible a more vigorous prosecution of his investigations in the metallurgical laboratory of Harvard University.

National Supply and Machinery Dealers' Association.

Secretary-Treasurer J. H. Drury, of the National Supply and Machinery Dealers' Association, arrived in Cleveland on May 13 to take up permanent headquarters. New members are being added rapidly and the growth of the association has surprised those who inaugurated the movement. Mr. Drury will be located with the Strong, Carlisle and Hammond Co.

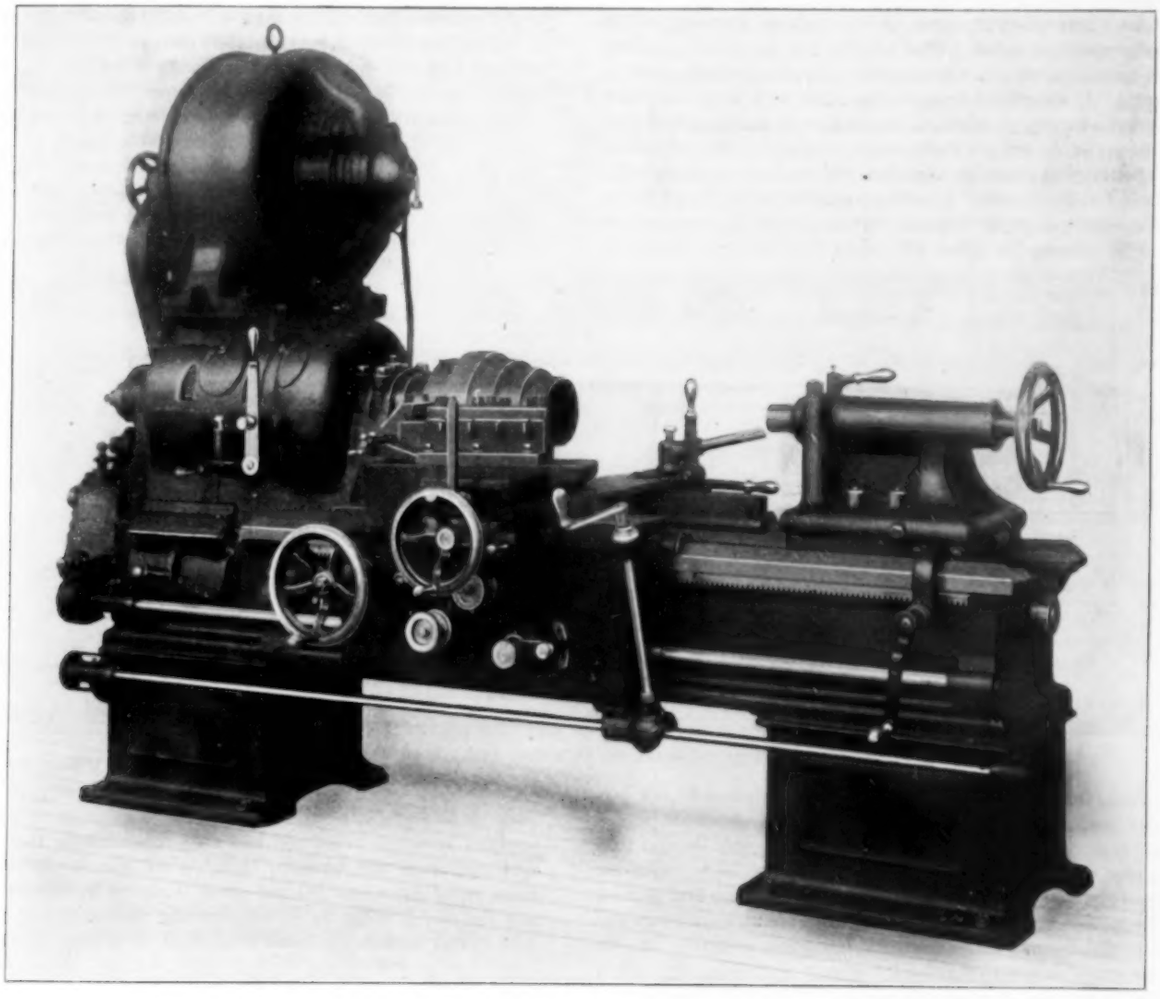
The executive committee, at a meeting held May 16 appointed a machinery committee composed of the following: F. H. Brown, of the Brown & Zortman Machinery Co., Pittsburg, Pa.; A. J. Babcock, of Manning, Maxwell & Moore, Chicago, and H. Prentiss, of the Prentiss Tool & Supply Co., New York. The prime object of the National Supply and Machinery Dealers' Association, as has been stated, is to promote a closer relation between the manufacturer and the jobber. This association is in no way affiliated with the Southern Supply and Machinery Dealers' Association or the American Supply and Machinery Manufacturers' Association. The scope of the new association will be from coast to coast north of Mason and Dixon's line.

MOTOR-DRIVEN LATHE WITH ALL-GEARED HEAD.

The engravings depict a 24-in. x 8 ft. lathe built by the American Tool Works Co., of Cincinnati. This machine is shown with motor drive through patent all-geared head, and is also equipped with special multiple tool rest used in the rapid turning of cone pulleys. The motor is nine horse power of the direct current, variable speed type, 600 to 1,200 r. p. m., and is easily started, stopped and reversed by the controller handle, conveniently placed at the right end of the carriage. The large number of speeds electrically obtained supplement the fundamental speed charges obtained mechanically through the all-geared head.

The all-geared lathe head is a new changing device which provides four spindle speeds, the ratios of which are 32.5 to 1, 10.8 to 1, 4.31 to 1 and 1.44 to 1. On account of the high gear ratio and the wide face driving pulley the great power of this device is evident, the lathe taking without evidence of distress, continuous cuts entirely beyond the pulling power of the ordinary lathe of much greater swing. Each mechanical speed is obtained instantly while the machine is in operation, through the manipulation of two levers, shown on the front of the head, which in turn operate powerful, positive clutches. Only six gears are required in this device. They are coarse pitch, wide face and cut from the solid, and being arranged to run at very low pitch line velocities, reduce to a minimum the noise incident to all gear drives. They are completely and neatly housed, with easy access to all working parts and with means for thorough lubrication. There are no slip gears, pull pins, hollow shafts or tumbler gears and there is an absence of complicated, delicate or frail parts.

All shafts and the spindle run in best quality phosphor bronze boxes of liberal dimensions. These are provided with improved and effectual means of lubrication. The necessary adjustment for any desired speed can be determined readily by reference to a simple yet complete index plate on the front of the head. In addition to the all-geared speed changing device, the lathe is equipped with the rapid change gear mechanism, providing a wide range of changes for feeding and screw cutting, each change instantly obtainable while the machine is in full operation, and without the removal of a gear. A simple index plate shows how to obtain any desired feed.



MOTOR DRIVEN LATHE WITH MULTIPLE TOOL REST FOR CONE PULLEY PRODUCTION.

The lathe, though motor driven, may be arranged for belt drive by simply replacing the gear on the driving shaft with whatever size pulley is desired. As it is unnecessary to shift the belt to change the speed, a pulley of very wide face and large diameter may be used. The regular carriage equipment consists of compound rest and full swing rest. The lathe is built for heavy duty, and will fully utilize the best high speed tool steels.

Manufacturers of Hartford, Conn. have established a unique bureau of information for keeping records of employes, of which there are 10,000 mechanics, operators and skilled workmen in that city. Factory men say the card index system adopted is one of the best devised for mutual protection, and also weeding out the good from the undesirable employes.

DEUTSCH ELECTRIC LIGHT FOR TRAINS.

It is conceded that electric light is ideal for railway passenger cars and that the advantages of the axle light or unit system are: That each car carries its own equipment and therefore permits of greater flexibility in the make up of trains, and no auxiliary compressing or charging plants are required. It is to be noted that the axle light is the one system of electric train lighting which can be gradually introduced on railway cars without entirely changing the existing lighting conditions.

The Deutsch system, Figs. 1 and 2, consists of a dynamo hung from the car body, a regulator, located in any convenient place in the car, a transmission or drive and the usual storage batteries. The storage battery is intended to supply current for the lights when the train is standing or running at less than a specified speed. The battery can be relied upon to perform this service if it is properly charged when the train is running. It sometimes happens, however, with belted machine that the belts slip or come off the pulleys so that in either case the batteries do not get their proper charge. If this continues the batteries do not act satisfactorily and are consequently blamed for the trouble. In winter months, especially when escaping steam or condensed moisture on the pulley faces makes them as slippery as glass and when the lighting demand is heaviest, this trouble becomes greatest. Batteries do not last under these conditions as long as they otherwise would, nor is their capacity near the rated, consequently it may be said that in order to derive the greatest value from the most expensive part of the axle lighting equipment and to maintain that portion in its highest state of efficiency, a drive must be used which can be depended upon to do its work uniformly and reliably. In many cases where two sets of batteries are necessary with a belted equipment, one set will answer the purpose if used with a properly designed gear drive.

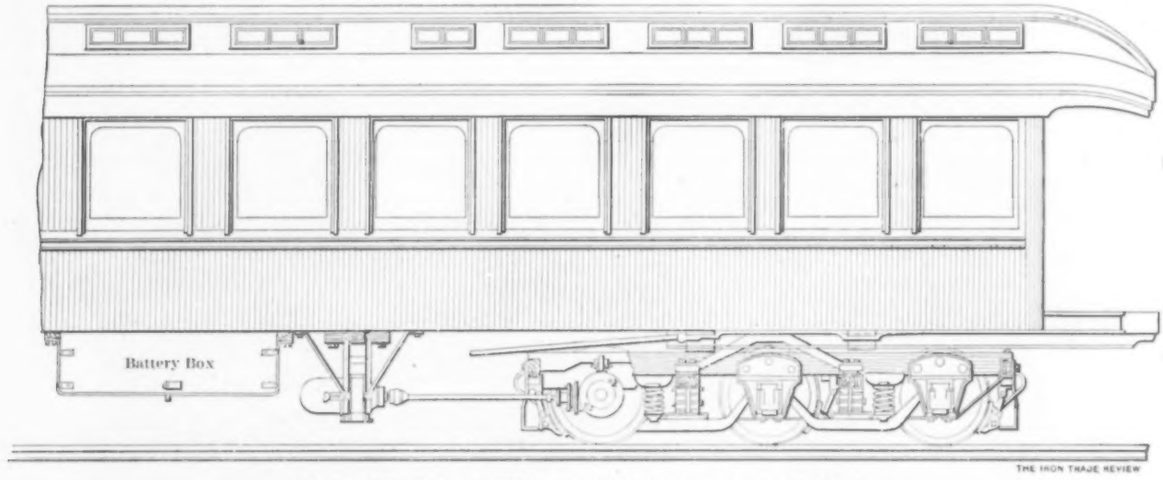


FIG. 1—THE DEUTSCH TRAIN LIGHTING SYSTEM IN APPLICATION.

The drive consists of a steel bevel gear provided with a suitable hub extension, forming a bearing immediately adjacent to the tooth face. The gear is secured to the axle. Encircling the bearing is a steel strap to which a stud is electrically welded. The stud forms a bearing for a rawhide pinion in mesh with the steel gear fastened to the shaft for driving the dynamo. This shaft is telescopic with universal joints to allow for axle play and side motion of truck on curves. Any tendency of the strap to revolve with the gear around the car axle is counteracted by a rod projecting upward and flexibly supported by the truck frame. A steel gear casing is cast integral with the strap, thus making the gear casing, strap and pinion bearing in two pieces which are bolted together and carried by the hub bearing of the gear. Both the gear and pinion are supported directly from the axle, that is to say, the driving gear wheel is attached to the axle and the pinion meshes with the gear, turning on a stud forming part of the strap which surrounds the gear bearing and moves coincidently with the gear wheel.

The dynamo, Fig. 3, is rigidly suspended under the car body. The bearings are self aligning and ring oiled. The wear on the bearings has no strains due to belt pull and the flexible nature of the shaft connection prevents shock. The armature can be removed, a new one substituted and everything put in proper order for immediate service in fifteen minutes. Both bearings are the same size and all screws holding removable parts are standard and of same size. The casing can be removed, completely exposing the machine for inspection by slacking two wing nuts and the armature or bushings may be renewed without disturbing any electrical connection.

The essential parts of the regulator are: An automatic switch, a controlling solenoid, an air valve, a piston working in a cylinder and carrying electrical contacts on the rod and a resistance located in the shunt field circuit of the dynamo.

The automatic switch cuts the dynamo in and out of the lamp circuit above and below a specified train speed, that is to say, when the train runs below the specified speed, the lights are on the storage battery, and above that speed, they are on the dynamo. As the train velocity increases and the dynamo turns faster than the speed required for maximum output, the controlling solenoid opens the air valve and admits air to the back of piston which raises and carries with it the electrical contacts attached to its rod and cuts resistance in the shunt field circuit of the dynamo, reducing its output. When the train speed decreases, the air valve is closed by the solenoid and the piston drops by gravity, cutting resistance out of the field circuit until the dynamo is again at its normal maximum. This regulator does not depend upon electrical means for its operation but is driven by compressed air from the brake mechanism. A very small volume of air is required at about 15 lb. pressure. Its working is noiseless and there is no motion except when the train speed materially changes. There are no rotating parts to cause trouble and all electrical connections are simply and conveniently arranged.

These machines are furnished with all parts made to gauge and all corresponding parts interchangeable, thus insuring maximum of speed and minimum of cost in making renewals. The Electric Controller & Supply Co., of Cleveland, is licensee of the Deutsch patents for the United States, Canada, and Mexico.

An involuntary petition in bankruptcy has been filed in the United States court, at Milwaukee, against the Wm. Bayley & Sons Co., which owns a foundry and architectural iron works covering several acres. The property and plant is worth in the neighborhood of $200,000.

R. A. Hadfield on Progress and Outlook in Iron and Steel.

The presidential address by R. A. Hadfield, of Sheffield, Eng., at the meeting of the Iron and Steel Institute, which opened in London on May 11, was a noteworthy review of recent progress in the metallurgy of iron and steel. Instead of the usual brief address Mr. Hadfield had prepared one covering 79 printed pages, 5½ x 8½ in. At the outset he spoke of the work of the Institute and of its important contributions to the literature of iron and steel. As proof of the cosmopolitan character of the organization the speaker cited the election of Andrew Carnegie as a representative of the United States to the presidency of the Institute, and expressed the hope "that in the near future some of our kinsmen across the seas will again be elected to the chief office." The membership of the Institute was shown to have increased from 770 in 1884 to 2,000 at the present time. About 400 of the present members are in the United States, Germany, Sweden, France and Belgium, about 1,600 belonging to Great Britain. Answering the question raised recently by a technical journal in Great Britain and by another in the United States, "Can Great Britain continue to enjoy the prestige of having within its borders the largest number of metallurgical societies?" the speaker said that if right steps were taken there was still every reason why the answer should be most strongly in the affirmative.

In 1904 there were in the United Kingdom 893 "technical" societies with a membership aproximating 200,000. The Institution of Civil Engineers founded in 1818 occupies the first place in membership, with a total of 7,954. The Iron and Steel Institute has used 66 volumes of Proceedings, containing 686 original papers and about 35,000 pages of matter. Last year 2,309 abstracts of technical papers and articles were prepared by the secretary, Bennett H. Brough, and incorporated in the Institute Proceedings. The president spoke at some length of the great and excellent work done by the technical press in preparing for the use of iron and steel manufacturers and for all workers and investigators in kindred lines. Such a body of literature as is now available, keeping track of the latest developments in all lines and in all countries. He urged all, particularly the younger members of the Institute, to start a card index as a means of keeping track of such articles as they would have use for, and to keep their records of past work readily accessible.

Passing rather rapidly over the topics of research, invention and the history of metallurgy, the speaker discussed the contributions of recent metallurgical research to modern progress. In discussing the world's future needs in iron and steel he said:

World's Requirements in Iron and Steel.

"The immediate past of metallurgy has been great indeed in the enormous productive power that has been created, especially during the last 25 years; but should the nations of the East develop needs for iron and steel—and there is every probability that they may during the present century—then outputs which now seem to us immense will pale into insignificance. An Anglo-Indian, competent to judge, told me recently that it cannot be long before India must have 100,000 miles of railway.

"Supposing the whole population of the globe, now reckoned at over 1,500,000,000, or say even two-thirds of this number, eventually call for as much iron per head as is used now by each inhabitant of America and the United Kingdom—about 560 lb. per head—the demand would then rise to the figure of not far short of 300,000,000 tons per annum. This, too, does not take into account the increasing demand per head. Edward Atkinson, the well-known statistician, of Boston, estimated that the United States, by its average increase of population alone of 2,000,000 annually, called for a yearly increase of iron of half a million tons, and this assumed that the annual consumption remained at 560 lb. per head, whereas it is constantly increasing. If, therefore, the law of accelerating consumption continues as in the past, it is doubtful whether even an annual average increase of 1,000,000 tons will suffice. In other words, in 1920 the probable American production of iron should be over 30,000,000 tons per annum. Dr. Atkinson estimates that this quantity will be required at an even earlier date if proper allowance is made for increasing consumption per head.

"If the growth of universal demand spoken of take place, and there is every possibility that it will, may not trouble then arise on account of the scarcity of ores? As there is no other equally useful metal in sight, husbanding of the world's resources will have to take place.

"Although this may seem a resuscitation of the Jevons theory, but applied to iron, as it formerly was to coal, there must be good grounds for taking the view that, unless methods of economically working the vast sources of poor available ore are devised, at the end of the present century there will be an insufficiency of available iron ore, the seriousness of which it is difficult to estimate.

"As is well known, iron ore exists largely on the earth's surface, and the fact supports Sir Robert Ball's theory that the sources of this noble metal must have been originally from without and not within the earth, in which case supplies

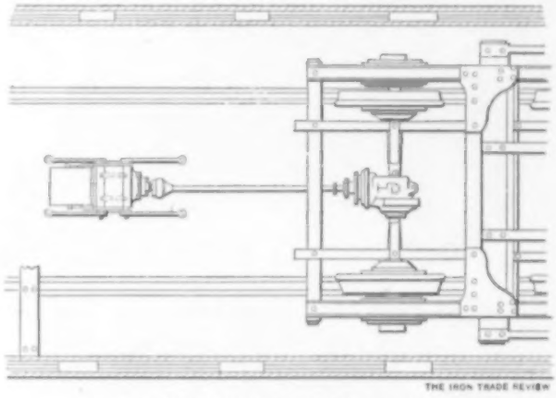


FIG. 2.—THE LIGHTING EQUIPMENT IN PLAN.

cannot reasonably be expected to be found below the surface. This is a view which, if correct, points to a narrowing of our supply."

Raw Materials.

Under the heading of raw materials the speaker discussed the probable sources of future supplies of iron ore. Diagrams were presented showing that if the ratio of increased production of iron continues in the future as in the past at least 450,000,000 tons a year of iron ore would be needed by the year 2000. In 50 years the world's production of pig iron has increased from figures which may now be regarded as practically zero to over 50,000,000 tons a year, and if demand arises in the far East on a scale proportionate to that of the West, it will not be an idle estimate to say 100,000,000 tons of pig iron will soon be required annually. Already the United States is producing at the rate of 20,000,000 tons a year [23,500,000 tons is nearer the rate of the past three months.—Ed.] and Edward Atkinson has predicted that the demand in the United States would before long call for over 30,000,000 tons annually. At the present rate only enough iron is made in the world annually to meet the demands of about 200,000,000 people. If the demand continue to increase in the same ratio as in the past and if we allow for only 1,000,000,000 of people being supplied out of the 1,600,000,000 of the globe's population, then 250,000,000 tons must be made annually. At the present rate of increase, by the end of this century a supply of 145,000,000 tons should be reached and probably even this will be far from enough for the then existing needs.

Passing to the subject of sources of supply of iron ore the

speaker stated that since 1800 about 3,300,000,000 tons have been used up, that in the next 100 years no less than 15,000,000,000 tons will be needed, even if no allowance be made for increased consumption. Assuming that the rate of increase continues as in the past, about 30,000,000,000 tons of iron ore will have to be taken out of the ground during the present century. The speaker figured that in 1904 about 150,000,000 tons of iron ore was used [Official figures for production in 1903, statistics for 1902 being used in a few cases, made a total production of about 100,000,000 tons.—Ed.] If in a few centuries there is likely to be a lack of iron ore, the speaker considered that it was a matter of concern to watch this question, to study closely the metallurgy of iron so that every reasonable economy in the use of iron ores may be fostered. "It shows that the man who can make one pound of iron go as far as two is also a benefactor of mankind, and it follows that a knowledge of special steels, which are really economical steels, is of the highest importance."

Ore Supplies in England, Germany and America.

Reference was made to Mr. Carnegie's estimate that the iron stone of the Cleveland district would be practically exhausted in about 25 years. Over against this was the opinion of J. S. Jeans, who said that in such an estimate no credit is given for

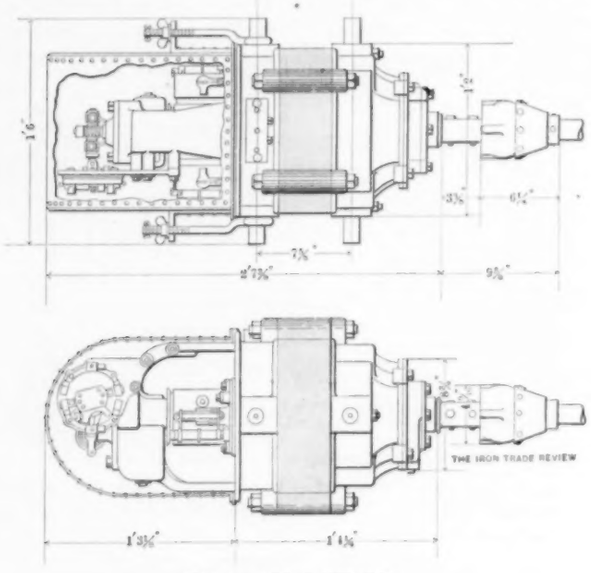


FIG. 3—THE GENERATOR.

the use of inferior grades of iron, still largely available. Mr. Jeans believed that while the estimated output of Cleveland iron ore in the past 50 years has been about 220,000,000 tons, that the source was not nearly exhausted, but little more than the fringe of the inferior grades having been touched. Mr. Jeans points out that neither the United States nor Germany at the end of 25 years will have virgin sources to draw on, so far as present knowledge permits a forecast. He adds that Germany claims to have at present larger unexhausted supplies of ascertained ores than there are in any other country, it being estimated that the minette ores of Lorraine are probably sufficient to support the present rate of working for 800 years. The speaker quoted 500,000,000 tons as the estimated proved supply of the Mesabi range and on the four old ranges of Lake Superior about 250,000,000 tons.

Electro Metallurgy.

Whether electro metallurgy can be applied to the economical production of iron and steel remains to be proved, in the view of Mr. Hadfield. Mysterious virtues have been claimed for electrically produced steel, but its very freedom from some of the elements which it is desirable to have present is a defect. The Canadian commission, which recently reported on electrical smelting, found that electrical energy must be very cheap indeed to permit of any competition with the blast furnace. An electrical furnace plant to produce about 350 tons of pig iron a day would require a water power electric plant with a capacity of at least 60,000 h. p. There are few places where this could be obtained and the cost of the plant would be excessive.

Attention was called to improvements in the manufacture of ordinary steel. These have been rather improvements in machinery than in processes. The Talbot continuous method and the Bertrand-Thiel process were referred to as important, but in the main only modifications of systems long in use. The Harmet method of producing ingots free from piping and settling was worthy of note as avoiding considerable waste. It would be of interest to know whether the ingots show any signs of "streaks," a cause of difficulty which has been quite troublesome in the manufacture of gun steel.

Alloys of Iron.

President Hadfield considered the alloying of iron with other elements one of the most important questions in metallurgy. Reviewing the history of progress in this line he recalled his own paper on alloys of iron and manganese read in 1888 before the Institution of Civil Engineers. It showed how impossible it was to predict the qualities of any particular combination of iron with another element except by actually testing each varying percentage. Later researches include those of Mr. Jas. O'Reilly on iron and nickel and more recent papers of Mr. Hadfield covering alloys of iron with silicon, aluminum, chromium, nickel, cobalt, copper and tungsten. A number of researches not yet published have been made by Mr. Hadfield on the effect of molybdenum, vanadium, tin, lead, manganese and other materials. Arnold's discovery referring to the true saturation point of alloys of iron and carbon was alluded to as most important. The significance of the discoveries as to the alloys will be appreciated, the speaker said, when it is remembered that the metallurgists of today are making it possible for a pound of iron to go as far as two pounds did formerly. The employment of special steels often means the use of less material, owing to increased durability or to greater strength, permitting the use of less weight.

Heat Treatment.

Heat treatment and metallography came in for considerable space in the address and the value of heat treatment was illustrated by this example: a nickel-chromium-iron alloy as forged may appear of no commercial value, but by judicious heat treatment with or without quenching in oil or water its elastic limit may be made to vary from 22 to 60 tons per sq. in., its tenacity from 40 to 96 tons per sq. in. and its ductility from 8 or 10 percent to 30 or 35 percent. We understand but dimly why these effects are produced, but in the main they are owing to resultant variations in the form of the carbide present or the infinite shades of conditions or combinations of the two. Seeing that there are now more than 80,000 different carbon compounds known to exist, the extraordinary influence and power of carbon when alloyed with iron need not be a matter of wonder. The value of improved pyrometers in connection with the advances made in heat treatment was spoken of with some detail.

Metallography was mentioned as a very important branch of scientific research, and reference was also made to recent low temperature experiments.

Advance in Foundry Practice.

Speaking of the foundry, Mr. Hadfield gave credit to the work of the American Foundrymen's Association and to Prof. Thos. Turner in England, who had investigated the action of silicon upon cast iron and to Prof. Ledebur from Germany, who had presented research on condition of carbon in malleable iron castings. The advance made in the United States in the use of chemistry in working cast iron was spoken of as having led to similar steps being taken

in Great Britain. Great progress has been made, according to the speaker, in the production of steel castings. Probably more heart-breaking and disappointing consequences have resulted from operations in the steel foundry than in any other branch of the steel industry. Happily many of the early difficulties have been overcome. The advantages derived from aluminum and silicon as solidifiers have cured most of the defects due to unsoundness. Increasing knowledge of analyses and qualities of the various sands and fire-resisting materials used in molds has been equally important. A range of product varying from that with ductility almost equal to the ductility of soft forge steel up to the hardest type is now readily obtained. Many of the difficulties still met with would be largely overcome if the engineer would consult the steel founder when preparing his designs and patterns.

The production of war material and the question of testing received attention in the latter part of the address. Referring in conclusion to market conditions, the speaker said that in England productive capacity is now being steadily employed and the shipping industry is very busy. Lancashire is having an unusual boom in the cotton trade. Much of the recent trouble in British industries came from the slackening of home demand due in part to the enormous national expenditure, but the worst is now over. South Africa, Canada, Australia and India are planning and carrying out railroad work on a large scale. Germany is busy with home improvements. If the war cloud in the East could be dispersed no doubt the world would enter upon an era of prosperity such as has never been seen.

Some American Records.

As an appendix to his paper President Hadfield presents the following sent him by Wm. R. Walker, assistant to the president of the United States Steel Corporation in the operating department:

"No. 1 Duquesne Furnace of the Carnegie Steel Co., located at Pittsburg, has produced 1,287,381 gross tons of pig iron on one blast furnace lining.

"Edgar Thomson Furnace K of the Carnegie Steel Co., located at Pittsburg, has produced 21,271 gross tons of pig iron in one month.

"The Edgar Thomson rail mill of the Carnegie Steel Co., located at Braddock, Pa., has produced 70,444 gross tons of rails in one month.

"The amount of metal tapped at the Homestead No. 3 open-hearth plant of the Carnegie Steel Co., located at Homestead, Pa., is equal to a 3-in. stream of molten metal, running continuously 24 hours a day for 300 days per year.

"The barb wire machines of the United States Steel Corporation produce 2.95 miles of barb wire per minute, for 24 hours per day, for 300 days per year.

"Steamer Augustus B. Wolvin discharged a cargo of 10,300 gross tons of iron ore in 4 hours and 30 minutes."

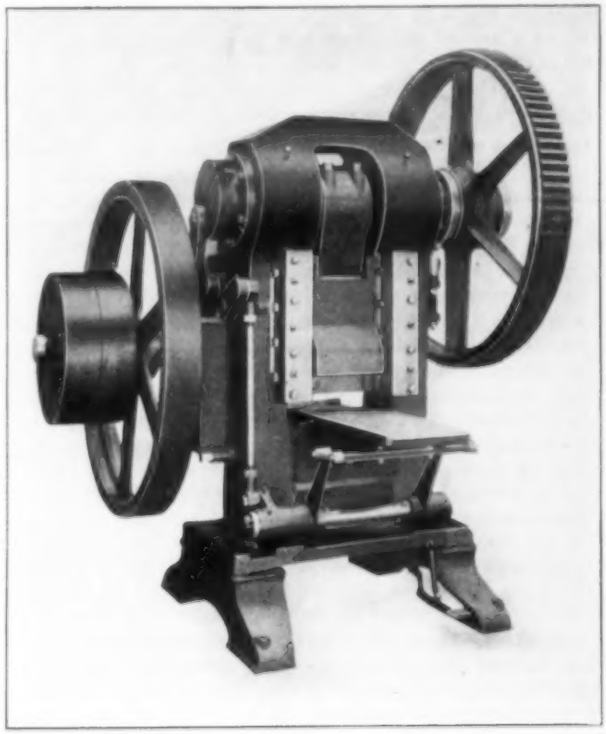
The Baltimore & Ohio railroad's car order has been distributed as follows: 3,000 steel hopper cars, 250 refrigerator cars, 3,000 steel twin gondola cars, 2,000 box cars, 1,500 steel gondola cars with wooden sides and 250 ballast cars. These have been placed with various car builders in the week. Smaller orders were as follows: Lehigh Valley, 100 cinder cars; Mobile & Ohio, 500 box cars; Illinois Central, 300 steel underframes; and Huntington & Broad Top Mountain railroad, 30 steel hopper cars.

The American Steel Foundries have received an order for cast steel body and truck bolsters for 2,000 Detroit Southern Railroad Co.'s cars. These cars will be built at the shops of the American Car & Foundry Co., and will consist of 1,800 40-ton gondolas, and 200 30-ton flat cars.

HEAVY EMBOSSING PRESS.

The press here illustrated has been built for heavy work, such as embossing paper labels and other work of like character. It has a very massive steel frame, the section of the uprights being 12 in. front and back by 8 in. right and left. The design results in a very compact machine. The shaft is of hammered steel, of the eccentric type and has a 2-in. stroke. The distance between the uprights is 20½ in. and the face of the slide is 13½ x 19¼ in.

An important feature of the press is the automatic die slide on which the work is placed. This automatic slide will accommodate a single die 12 in. front and back by 13 in. right and left, or several dies of smaller dimensions. After the treadle has been depressed, the slide automatically carries the work under the plunger. With the upward stroke of the plunger the slide recedes and takes the position as shown in the illustration. By detaching the automatic device and operating the die slide by hand, work as large as 18 in. front and back by



A BLISS HEAVY EMBOSSING PRESS.

13 in. right and left can be accommodated. The adjustment is effected by means of a wedge in the bed. This wedge is adjusted and held in place by means of a large screw shown in the lower part of the press-frame.

The flywheel of the press weighs about 2,000 lb. The large gear is shrouded and has a ratio of 7½ to 1. The floor space occupied by the machine is 84 in. front and back by 86 in. right and left. The total weight is about 19,000 lb. The press may also be used for forming and embossing operations in sheet metal and for this kind of work the automatic die slide is usually omitted. This press has been designed and built by the E. W. Bliss Co., Brooklyn, N. Y.

The Western Wire Goods Co., of Buffalo, has begun voluntary dissolution proceedings, and Robt. L. Cox has been appointed receiver. F. W. Standart has been named referee to hear interested parties. No date has been set for the hearing.

Cleaning of Blast Furnace Gas.*

BY AXEL SAHLIN, LONDON.

The rapid development of the gas motor during the last five years has given new value and importance to the gas escaping from the blast furnace, previously often described at waste gas. This "waste gas" has now become a potential source of energy, which, rightly used and husbanded, should, together with the gas from the coke ovens supplying the blast furnaces, suffice for the carrying out of the entire series of converting and finishing processes which transform the ore into marketable steel products. The gas leaving the blast furnace carries with it a varying amount of gritty dust, which has proved a more serious obstacle to the successful operation of large gas engines than any mechanical imperfection in the construction of these engines.

Successful efforts to remove the dust from the gas used in the gas engine, have, in a practical manner, demonstrated how wasteful and imperfect have been our previous methods of utilizing the valuable blast furnace gas. Until the appearance of the gas engine at the blast furnace plant the dust problem was, as a general rule, dealt with in a different manner by each of the three large iron-producing countries.

In England, in at least 90 percent of the blast furnace works, the dust in the gas was disregarded. A single downcomer carried the gas escaping from the tunnel-head into an underground gas flue leading to stoves and boilers. In this flue and in the stoves and boilers the bulk of the dust was deposited. Every few months a rather long stoppage, regularly attended by subsequent more or less costly disturbances of operation, was required for the cleaning of these flues, while the cleaning of stoves and boilers belonged to the daily routine of the works. English engineers were in position to ignore the dust problem, partly because of the customary slow driving, and partly because of the clean and firm structure of the materials used. But even with these advantages, stoves, and especially boilers, had often to be put out of operation, cooled down and cleaned, and the efficiency of the plant suffered.

In Germany the majority of the furnaces were equipped with a dry or wet dust-catcher, consisting of a series of upright tubes of small diameter, the open bottoms of which extended downwards into a common water-seal. The dust was deposited mostly by centrifugal force, as the direction of the flow of the gas was suddenly changed in passing through the cross tubes connecting one chamber with the other. Usually six of these chambers from 6 ft. to 8 ft. in diameter, and often 60 ft. in height, constituted the dust catcher. The collected dust was raked from the pan forming the water-seal by manual labor. The gas leaving the dust catcher could not be considered properly cleaned.

Since the discovery of the Mesabi mines American blast furnace engineers have been compelled to use a burden containing from 50 to 100 percent of dust-fine ore, and the question of cleaning the gas became one of imperative importance. The generally adopted American dust catcher consists of a wide, unobstructed chamber, through which the gas passes and in which its velocity is greatly retarded. The bottom of the dust catcher is built as a hopper, closed at its lowest point by a door or valve, through which the dust from time to time is removed by gravity. It required the appearance of the gas engine to compel improvements in these methods, and to stop, at least partly, the waste which we all complacently had permitted to go on from year to year. We have now learned and realize that the whole of the gas escaping from the blast furnace should be utilized for subsequent refining and finishing processes, and that, before being so used, it should be thoroughly cleaned. By cleaning all the gas we would save:

Saving by Cleaning Gas.

1. One stove per furnace. No reserve will thenceforth be necessary to maintain the capacity of the furnace during the periods of cleaning of the different stoves, and three stoves per furnace will give good practice.

2. The heating surface of the three remaining stoves may be made 10 percent smaller than hitherto, because, with dusty gas, the value of the heating surface will gradually decrease, whereas with clean gas it will have a permanent efficiency.

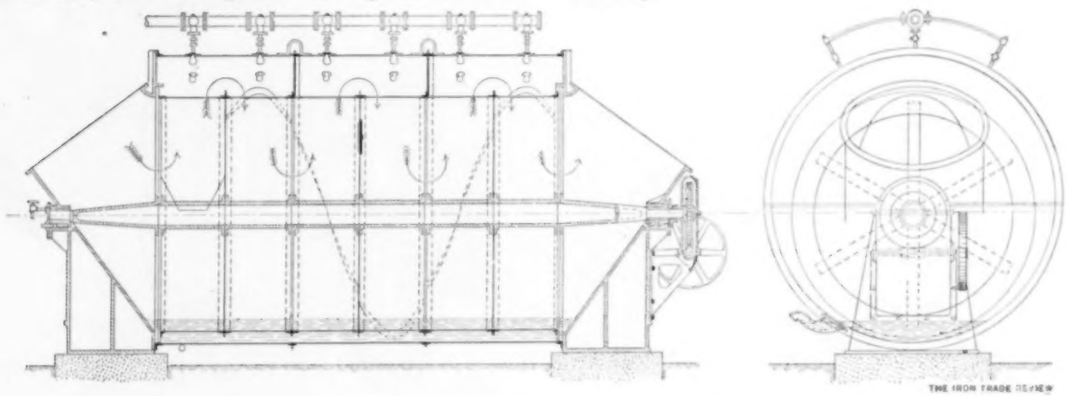


FIG. 1—SAHLIN REVOLVING GAS CLEANER.

3. The heating surface of the boiler plant may be reduced from 10 to 15 percent for the same reason, and because the necessity for periodical cleaning of the boiler settings will disappear.

4. The repairs to the boiler plant will be reduced as the strains due to frequent cooling of the boilers are avoided.

5. The labor force previously constantly employed in cleaning stoves and boilers may be dispensed with.

6. The more perfect combustion will reduce gas consumption and liberate for use in other departments a considerable percentage of gas hitherto wasted. The percentage of gas thus saved may be estimated at about 20 percent of the volume burnt in stoves and boilers.

7. The success of blast furnace operations depends entirely on the regularity and uniformity of conditions affecting the furnace. Uniform fuel gas will give uniform heat and uniform power, and will add increased efficiency to the furnace, which we all recognize, though it may not be easy to express the gain in exact figures.

Assuming, then, as an understood and accepted axiom, that blast furnace gas should be cleaned before being burnt, we proceed to consider the process of cleaning from two points of view—(1) The degree of purity reached, and (2) the cost of reaching it. It is the removal of the last fraction of a gram of dust contained in a cubic metre of gas which largely adds to the expense of cleaning. For stoves, boilers, kilns, furnaces, etc., such a small quantity of exceedingly fine and buoyant dust is no detriment, as it will pass off with the

*Read before the Iron and Steel Institute at London, May 10, 1905.

products of combustion through the smoke stack. A gas containing 0.3 gram per cubic millimetre, or less, is sufficiently clean for these purposes.

For the gas engine, on the other hand, the gas can never be too pure, and the removal of the last tenth of 1 gram, though expensive, will pay for itself in longer life and decreased repairs to the expensive engines.

Three Stages in Cleaning.

The cleaning of the blast furnace gas should, therefore, take place in three stages, as follows:

1. The preliminary dry cleaning, which does not involve extra operating expenditures.

2. The wet cleaning to fit the entire quantity of gas for use in stoves and under boilers, in roasting kilns, furnaces, etc.

3. The special cleaning for purifying part of the gas for power purposes.

1. *Dry Cleaning.*—The gas should be removed from the blast furnace as much as possible symmetrically around the circumference of the furnace, so as to avoid an excessive flow of gas in any one direction. The use of four gas uptakes,

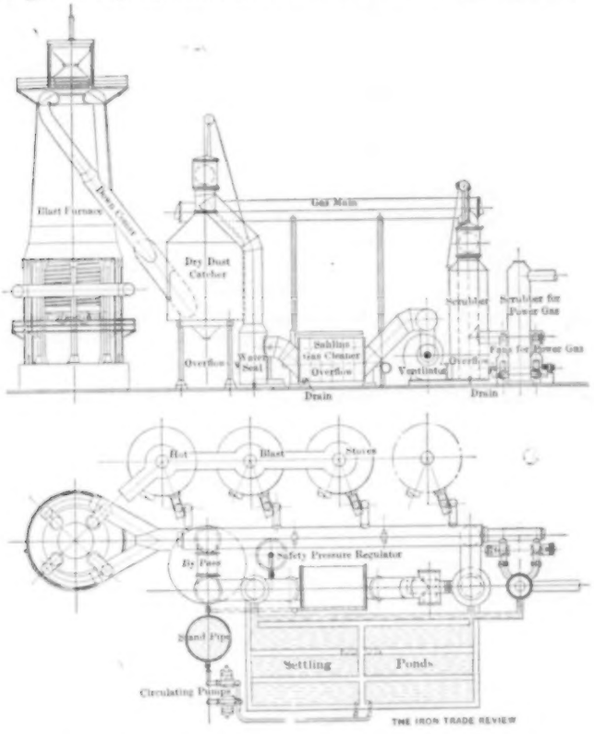


FIG. 2—GENERAL ARRANGEMENT OF A GAS CLEANING PLANT.

which, curving downwards, should unite into one main downcomer, is to be recommended; this downcomer to enter the dust catcher tangentially and near the bottom of the chamber. It is a mistake, from the point of view of cleaning, to make the downcomer too wide. It should be designed so as to cause the gas to flow with an average velocity of from 25 to 35 ft. per second. The dust catcher should be built in the shape of a vertical cylinder with conical top and bottom; it should have a diameter of not less than four times that of the downcomer. The delivery opening from the dust catcher should be placed centrally at the top of the same. The gas will, by this arrangement, on entering the dust catcher, be given a rapid swirling motion, and the two powerful and inexpensive agents, gravity and centrifugal force, will combine to deposit in the dust catcher all the heavier particles of dust. According to the nature of the materials charged the dry dust thus collected may, or may not, be worth briquetting and recharging.

The gas leaving a well-designed dust catcher may still contain from 2 to 8 grams of dust per cubic metre, depending largely on the character of the ore employed and the rate of driving of the furnace. The whole volume of gas should next be submitted to the second stage of the cleaning process.

2. *Wet Cleaning.*—The second cleaning should be effected by means of water. Experience has proved that the fine dust settles most readily on cool and moist surfaces. The passage of gas through open chambers, even though profusely sprayed with water, has not proved effective.

Inventive effort has, during the past five years, been directed towards providing gas cleaning apparatus, which may be grouped into three classes: (*a*) Stationary cleaners or scrubbers. (*b*) Rapidly revolving or atomizing machines. (*c*) Slowly revolving or fresh contact cleaners.

(*a*) *Stationary Cleaners.*—These consist of chambers from the top of which sprays of water, distributed over the entire section of the chamber, descend. The water is arrested by a number of grids or porous masses of material with numerous interstices. Iron bars—rolled and cast—tangled wire, coke or wooden slats, have all been used with success as filling material or grids. The gas enters the apparatus from below the grids and ascends, meeting the sprays of water falling from above through the innumerable interstices in the obstructing grids or masses, to the wet surfaces of which the dust adheres, only to be washed away by the falling drops of water. The Zschocke cleaner is a well designed type of such apparatus. It is claimed that the gas leaves this apparatus with from 3.0 to 1.4 grams of dust per cubic metre.

(*b*) *Rapidly Revolving Machines.*—The earliest form of the rapidly revolving or atomizing apparatus was, as a matter of course, the fan. Having been in use for generations, it was at once available as a mechanically perfect tool. The water injected into the fan, together with the gas, was forcibly dashed against the casing, removing the dust. A modification of the fan is the Theisen apparatus, which provides a forced contact between gas and spraying water driven against a cylindrical envelope by fan blades set at oblique angles to the axis of rotation. There are probably no more effective contrivances known today for elimination of the last fractions of a gram of dust per cubic metre than a properly designed and rapidly revolving fan or a Theisen apparatus. But the good work is not done cheaply, as the power consumed for revolving the blades increases greatly when the water sprays are put in operation. This class of apparatus is, therefore, most suitable for thoroughly cleaning the portion of gas used for generating power.

(*c*) *Slowly Revolving Apparatus.*—The considerable power required to drive rapidly revolving water-sprayed fans on the one hand, and the difficulty of insuring a thorough and uniform cleaning of the grids or chequers of the stationary apparatus on the other hand, led to the design of the slowly revolving gas cleaners, which are particularly suited for the second, or wet, cleaning of the entire volume of gas produced by the furnace before it is admitted to the stoves, boilers, kilns, or to the fans which finally prepare it for the gas-engines.

The Bian apparatus is the earliest form of this type, and has proved very effective. It consists of a horizontal cylindrical casing, through which the gas is passed from end to end. In the axis of the cylinder revolves slowly a shaft, to which are bolted a number of circular discs of perforated plates of a diameter but little less than the inside diameter of the casing. The gas is therefore in its progress compelled to pass through the perforations in the discs. Between the perforated discs extend from the outer envelope annualar deflecting plates, which compel the gas to approach the center of the apparatus after each passage through the perforations in the revolving discs. The outer shell is filled with water up to the bottom of the central shaft. In revolving the perforations in the discs are therefore dipped into water and thoroughly washed for every revolution of the apparatus, and ascend from the bath covered with thin films of water. The

dust which settles on the bottom of the apparatus is from time to time drained off through suitable sludge valves.

This apparatus is effective, and requires but little power slowly to revolve the central shaft and the discs fastened thereon.

Sahlin Revolving Gas Cleaner.

With the view of securing larger capacity of each apparatus (that is, a larger area of perforations in proportion to the diameter of the apparatus), a better and more continuous wetting of the perforated surfaces and a more automatic and constant removal of the dust, my firm has designed a new style of slowly rotating gas cleaning apparatus, which has been named the Sahlin revolving gas cleaner, shown by Fig. 1.

It consists, like the Bian apparatus, of a horizontal cylindrical shell. Parallel with the axis of this shell, but somewhat below the centre of the same, is placed a horizontal shaft. On this shaft are fitted, alternately, spider arms supporting rings of double 3-in. angle iron riveted together, and solid plate discs carrying at their circumference similar angle rings. Between the angles of the spider arms and those of the discs are bolted perforated plates forming the envelope of a drum. The oblong perforations are wider at the end of the cylinder where the gas enters, and gradually narrower towards the discharge end. Between the outer shell and the inner revolving drum is formed a horseshoe-shaped space, widest at the top. Closely behind the rim of each spider, this space is divided by plate diaphragms riveted to the outer shell, and practically closing the open area between shell and drum. To the angle rings of the frame, supported by the spider arms and by the discs, are bolted a series of spirally bent flat bars, or scrapers, which closely approach the bottom of the shell. Near the gas inlet is riveted, to the lower part of the shell, a water-sealed discharge opening. At the bottom of the shell, near the gas entrance, a drain-cock or sludge valve is provided for emptying the apparatus. Along the top of the shell three rows of sprinklers are arranged, so as to deluge the entire top of the revolving perforated plates with a dense spray of water. The drum is turned by worm and worm gear through a belt pulley driven from the ventilator described below.

When gas enters the apparatus through the head of the outer shell, it is admitted into the drum between the spider arms supporting the first angle iron ring, but it is then confronted by the first solid disc. The only passage offered is through the narrow and dripping perforations of the drum. In passing these, the gas is met by the profuse spray from the sprinklers. It is at the same time spread out into a thin sheet in the horseshoe-shaped space between the two cylinders, and advances outside and beyond the first revolving disc until met by the first horseshoe-shaped diaphragm, which prevents further progress and compels the gas again to enter the interior of the drum beyond the first disc. Passing through the openings in the second spider wheel, it is again compelled to flow outward through the perforations in front of the second disc, and so on, the gas passing forward and back through the perforated envelope, now spreading itself into a thin layer, now contracting itself into a cylindrical column, and continuously exposed to the intense spray from the the sprinklers. The gas has, of course, to turn an angle of 180 degrees for every time it passes through the perforations. It is finally delivered through the discharge opening, which corresponds to the opening of admission, at the opposite end of the shell.

The dust is settled in the water at the bottom of the shell and is moved by the spirally-bent scrapers towards the inlet end, where it is discharged automatically through the water-sealed overflow.

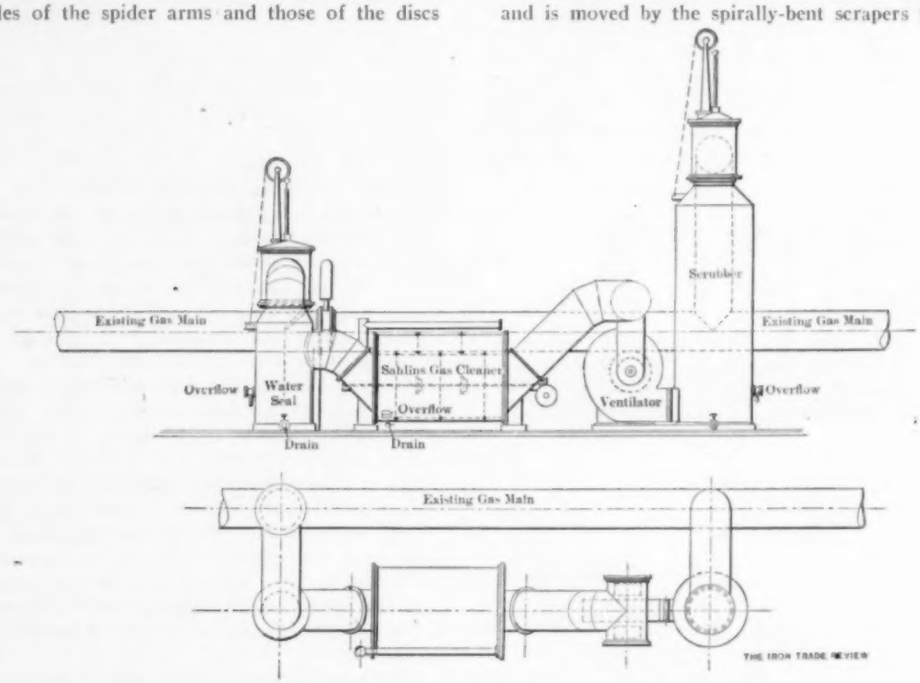


FIG. 3—SECONDARY CLEANING PLANT ATTACHED TO EXISTING GAS MAIN.

As the areas of drum, perforations and horseshoe-shaped space are all very large, compared with the section of the downcomer, the velocity of the gas in passing through the apparatus is greatly reduced. The resistance offered by the apparatus is, therefore, insignificant, even though the entire volume of gas produced by one furnace is passed through a single apparatus.

The perforated drum is revolved about six reversions per minute, requiring less than 1½ horse power, which power is transmitted by a belt from the shaft of the ventilator.

It has been found that whether a stationary or slowly revolving apparatus is used for the second cleaning, the tunnel-head pressure must be assisted by a ventilator, to insure an even flow of gas. This ventilator is, however, by no means as great a consumer of power as would be water-sprayed cleaning fans or automizers. A ventilator passing 40,000 cubic feet of gas per minute (equal to about 70,000 cubic meters per hour) against a head of 2 inches water column, requires only about 35 horse power.

Safety Device.—If for any reason, such as the hanging of the furnace or the sudden stopping of the blowing engine,

the flow of gas from the furnace should cease or be reduced, there is, with all forms of gas cleaning apparatus a danger that air may be drawn into the apparatus and gas tubes, where the mixture of gases formed may, in unfavorable circumstances, cause serious explosions. To prevent the possibility of this, I recommend a very simple and effective device, consisting of a small gasometer having a diameter of 8 ft., with a lift of 6 in. This gasometer is so balanced that it will drop when the pressure inside the piping falls to ¼-in. water column.

The interior of the gasometer is connected by a pipe with the dry dust catcher. An arm projecting from the top of the gasometer connects with a switch in the circuit carrying the electric current to the motor driving the ventilator and cleaner in such manner that when the gasometer drops, the current is broken and the motor stopped. When the returning pressure in the dust catcher causes the gasometer to rise, the circuit is automatically closed and the cleaning apparatus started.

Arrangement for Cleaning Plant.

A general outline of the cleaning plant for the entire volume of gas from one blast furnace is shown by Fig. 2.

The gas leaves the furnace through four uptakes placed at 90 degrees angle. These join into one downcomer, which delivers the gas in one tangential direction into a cylindrical dust catcher. From the top of the dust catcher the gas passes through one of two mushroom valves. The valve nearest to the stoves connects the dust catcher direct with the gas main, and is opened only in case of repairs to the gas cleaning plant. The second valve connects the dust catcher with a water-seal, from which the gas flows into the Sahlin gas cleaner described above. From this gas cleaner it reaches a ventilator which delivers the now sufficiently clean and cooled gas into the bottom of a dryer. By closing the drain pipe and admitting water, this scrubber or dryer may be changed into a second water-seal, effectively isolating the cleaner. Cross bars inside the dryer carry a column of coarse coke. In passing through this the gas is freed from the bulk of the water which may be mechanically carried from the second or wet cleaning. At the top of the dryer a mushroom valve again admits the gas into the general gas main. There is no spare or reserve provided for this simple wet gas cleaning plant. The damage caused by occasionally, for short periods, using gas direct from the dust catcher, as is now being done continuously, is not sufficient to justify an increased investment in duplicating the plant.

The power required for the second stage of cleaning of 40,000 cubic feet of gas of a temperature of 20 degrees C. is, as above stated, 36½ horse power, to which must be added 8 horse power for pumping of cooling water.

Gas for the power plant is drawn from the clean gas main and is passed through one of two electrically driven fans sprayed with water and discharging into a second smaller dryer, whence the gas, now just free practically speaking, is sent to the engines. The size of this plant depends upon the quantity of gas required for power purposes. A fan cleaning 10,000 cu. ft. per minute, and using 8,000 gallons of spraying water per hour, requires about 65 horsepower, and will supply gas engines of from 5,000 to 6,000 h. p. The pumping of spraying water will require about 3 horse power additional.

The cooling water used in the cleaning processes is delivered into double settling and cooling ponds, and is thence lifted by centrifugal pumps into a standpipe or water tank, from which it is returned by gravity to the cooling plant. On top of the tank may be arranged trays for additional cooling of the water.

Slightly modified, as shown by Fig. 3, the secondary cleaning plant may be attached to any existing gas main. A slide valve is inserted into the gas main, and on either side of this valve is placed on top of the main, a mushroom valve. The mushroom valve on the side nearest the furnace will connect directly with the water-seal and the Sahlin gas cleaner. The mushroom valve on the side away from the furnace will return the gas directly from the dryer into the existing gas main. Should it be necessary to stop the gas cleaning plant, the slide valve is lifted and the mushroom valves closed, the gas, according to present general practice, passing directly from the dry dust catcher to stoves and boilers, or to the special cleaning plant for the gas engines.

Interruptions in the working of the secondary cleaning plant will, however, be infrequent, as the simplicity and solid construction of the plant will reduce repairs to a minimum.

IMAGINATION IN ENGINEERING.

It is one thing to solve a problem which is definitely stated; it is quite another matter to formulate the problem from a lot of promiscuous data. It is one thing to design and assemble apparatus to meet specific requirements; it is quite another to decide what are the actual requirements to be met, or what will be the demands, when new methods produce new conditions.

The larger engineering problems involve indefinite data, and greater ability is required in their formulation than in their solution; they project into the future and must anticipate conditions for which there is no precedent.

For many years the increase in Bell telephone subscribers was about 10 percent per annum. For the past five years it has averaged 29 percent. The number of subscribers' stations added last year was greater than the total number in 1897, after 21 years of growth. Should the engineer in laying out conduits and pole lines and switchboards provide for a continual doubling of subscribers every three years?

The street railway facilities in our large cities present a record which would be ludicrous were it not so serious. The horse cars gave place to electric systems of large and rapid cars, but the crowding becomes denser. In Boston a subway was accepted as the solution, but passengers came faster than facilities; an elevated road was added and the subway was reconstructed to admit the larger cars; the facilities were still insufficient and the platforms were reconstructed for longer trains. In New York with its extended surface system, its elevated roads and new subway, it may be questioned whether the probability of getting a seat was not better in horse car days than it is at present.

Telephony and traction are not simple self-contained problems; they react on social and business life. People form new habits. The more they talk and travel, the more they need to talk and travel. The telephone—the high-speed tool of the business world—intensifies activity and requires more telephones. Facilities for travel induce more travel. The telephone and the electric car are not passive elements in modern progress—they are active accelerating forces which increase its rate.

What is true in larger things prevails in smaller ones as well. Some time ago a motor was to be placed in a sawmill. Measurements indicated a trifle over 20 h. p. was being used. A 30 h. p. motor was installed. A year later the investigation of a complaint showed an actual output of nearly 40 h. p. and the motor was replaced by another of 50 h. p. When there was a reliable motor behind the saw it was discovered that an increased rate of feed was possible and the output of mill and of motor were far more than anticipated.

Many electric plants—central station, railway, transmission, industrial—have required not merely increase, but reconstruction and change of system or method, because the original provision for development was entirely inadequate as the future had not been correctly gauged.

Imagination is essential to the engineer—a constructive creative imagination, tempered by experience and level-headed judgment, which can anticipate conditions not known to experience and foresee the means of meeting them. The engineer who cannot see beyond the present is not a safe guide. —[Chas. F. Scott in the Electric Club Journal.

LABOR SAVING IN STOVE MANUFACTURE.*

BY JOHN MAGEE, BOSTON.

It is remarkable how few appliances the stove industry has that are primarily labor-saving and that are new enough to be of interest. A little thought naturally separates our subject into two divisions: (1) Labor-saving machinery and tools, and (2) Labor-saving shop methods. We are largely limited in the stove business by the fact that it is nearly impossible to devise automatic machinery which will prove profitable, due to the fact that there are few articles of manufacture which require so many distinct and different operations as does the ordinary cooking range. The performance of any one operation averages a limited number of times in any one day; and no automatic machine can be made to pay unless it can be kept reasonably busy, so that the interest, depreciation and other charges of the costly machinery will not eat up the profit. In some few cases it has been possible to construct machines that will perform several operations on one piece, or the same kind of operation on several pieces of varying character, as in the automatic polishing machine. But such examples are rare and most of the profit-makers in the labor end of a stove factory are trivial in themselves; it is the total of many such that counts.

Beginning at the foundation of all our profit, and incidentally much of our trouble—the foundry—we find the molding machine gives greatest promise, although not in any way entirely satisfactory as yet. To get best results it should be installed with automatic sand tempering and riddling machinery, conveyors to deliver and remove the sand, and with methods of doing all lifting and handling by power. Each of these individual problems has been fully worked out for classes of work other than stove plate, but as yet unconsolidated into a complete system to produce high grade castings. Some genius also has a large field before him in the production of a machine which will print back-faced work and obtain as good results as by hand.

From the molding machine was pass naturally to a consideration of the flask question, and it is astonishing how little thought this important detail seems to have received. Iron flasks are decided labor savers and in many cases can be used with economy of handling far surpassing that of wooden flasks. The carpenter shop also will feel the pressure of repairing less. Snap flask work is hardly known in some shops, particularly in the East, and very few firms understand the labor that might be saved by their molders, as well as flask makers and yard men. In larger sizes, with detachable bars, which are either left behind when the flask is removed or withdrawn from the mold just before, labor-saving results may be obtained, particularly when used in connection with match plates of large size. Whether it be wood or iron flasks that are used, the yard men can gain time if every mold board is marked with the size of flask and clamps required, flasks and clamps themselves being marked to correspond.

Every modern shop should have either a track or a trolley, and if possible should have both, the trolley being best for delivering melted iron to the floors if so desired and the track surpassing for other purposes. If a track is to be installed it should, of course, connect with both yard and charging platform.

For handling material on and off the cars, as well as for use in other places, general favor now seems to be given to the penumatic hoist of motor block type in connection with proper traveling cranes, although electric hoists may also be used. This class of equipment is well known to all and hardly requires mention, yet, many of those foundries which, in addition to their stove work, make furnace and boiler castings, are wofully out of date in economy of handling bulky and weighty material. A rubber pipe connected to the compressed air system is taking the place of the time-honored bellows and in some places a pneumatic vibrator attached to the molding benches will save rapping the patterns and consequently decrease the labor of repairing breaks in the iron pattern shop. Water pipes to the molders' floor is a labor-saving device that costs little for the return it gives.

The core department of a stove foundry is generally of no great size, but is worthy of attention, as some of our factories are now including boiler work as a side issue. An automatic mixing machine has been found to give uniform results in this department and for fitting cores cast iron files cut quicker as well as cost less than steel ones. The ovens themselves are important. Design should be carefully considered and oil used for heating on account of the slight attendance required, particularly when thermostatic controlling is used.

The mounting shop has little new to offer that is of particular note; but there is a growing tendency to install what little machinery there is that can be used to advantage, and it is common now to see some kind of a conveying system for handling ranges from mounter to fitter and so on until finally landed in the storehouse. Work of this department is being facilitated by a profusion of emery wheels, drilling lathes, etc.; in fact, in some shops each man is given a complete equipment instead of using some machines in common with his neighbors.

Drilling being one of the larger mounting expenses, several plans have been tried to save labor in that direction, the use of tins to cast holes being well known. Some progressive firms are drilling with the aid of a complicated set of jigs and templates for which much is claimed.

Water fronts are almost the only pieces of stove casting upon which automatic machine labor can be satisfactorily expended, and it is now possible to procure a multiple drill which will work on eight water fronts at one time.

A few years ago the automatic polishing machine came into prominence and since then it has made considerable saving for those who use it, although producing work of doubtful quality, except in cases where the castings are especially designed to facilitate the operation. In this department polishing belts are superseding the old type of wheel for certain work and when wheels are used those composed of compressed cotton buffs cut rapidly and give wonderful results when used with some of the newer abrasives. On some classes of polished work hand labor on small castings has been almost entirely eliminated by the water polishing barrel.

In the nickel room a saving of labor may be made by placing the work on wire trays or baskets to be washed or otherwise treated. The basket hangs by an air hoist from a trolley and is lowered into the successive tanks.

In the cleaning room air hammers and pneumatic drills fitted to operate emery wheels and cleaning brushes are used in removing fins, gates and burnt sand from furnace and other castings of large size.

There is very little machinery of construction novel enough to warrant mention in our pattern shops, but a type of lathe with reversible head to admit the swinging of large work away from the lathe bed is of value; and the benches should be equipped with steam heated glue pot and with gas lamps for melting wax—trivial features and not new, yet, generally lacking. In the iron pattern shop a large blow torch driven by gas and compressed air is essential for straightening warped patterns, brazing, etc., and in this department one up-to-date concern has attached a file to the reciprocating part of a pneumatic hammer and is using it for filing.

Our shipping department sees great possibilities in the automobile as a labor-saving device in the place of unsatisfactory horse equipment, as the work of handling goods on and off trucks can be done by the same force that moves the machine, but as yet the large first cost has deterred almost everyone from adopting it until well out of the experimental stage.

Taking the second division of our topic, we find the greatest field for saving of labor to be in our shop methods, and foremost in the field is the use of an office system by which all

*From a paper read before the National Association of Stove Manufacturers at Chicago, May 10, 1905.

accounts can be handled by a card catalogue, reaching every corner of the works for all possible desirable information. The time clock is important as the clock cards themselves can constitute the pay roll when properly filled out. A billing machine should be used to make out shipping orders and can be adapted to make as many copies, either wholly or in part, as may be required. If so desired it will also make charge slips, car labels, railroad receipts, customer's bill, addressed envelope and such records as may be required for the office books, with one operation.

Our system must also contain provision for a record of every tool in the factory and in whose possession. This, in connection with suitable charges to workmen for tools lost, will soon save its cost in labor alone, as each man can be counted on to have his tools in their proper places where they can be found when wanted. Every pattern should also be catalogued, with size of flask, place that flask can be found and all other desirable information. All raw material in the stock room should be followed up by means of cards containing full information in regard to each article carried, so that it can be instantly located, and no goods should leave the room without an order suitably signed by both workmen and his foreman. Much could be written in detail of the card system alone, as applied to a stove foundry, but only the salient points can be touched upon here on account of lack of time.

Proper design of goods before leaving the drafting board will often save time for all of the direct manufacturing departments and although thought is spent on ornamental design, etc., practicability of manufacture is sometimes overlooked. The draftsmen can economize for the pattern makers and prevent mistakes by making a working drawing of each piece separately, although this is not generally done. Detachable nickel and similar devices, when properly designed on the drafting board, can save labor in the polishing, nickeling, mounting and packing departments.

Racks for castings should be carefully considered and should be placed in the center of the building, or where the light is poorest, instead of around the walls near the windows, and in similar places of value for the most economical application of labor.

Light is essential if labor is to be applied to best advantage and may be secured by as many windows as possible, rising from floor to ceiling with upper sashes of prism glass which must be kept clean. Proper ventilation and heating should be thought of, as labor always works to poor advantage in a vitiated atmosphere or improper temperature.

The location of all raw material should also be studied with a view to storing it near its place of use.

Systematic inspection of the plant once each month will discover defects in the building, machinery, etc., which can then be repaired with less labor than at a later date. In this connection it should be remembered that "stitch in time saves nine" and proper care of buildings at the proper time will soon pay for the labor incident to the maintenance of a separate department of repairs. Certainly not the least important of shop methods is the necessity of co-operation among all heads of departments. As much waste of labor can be caused by two departments pulling in different directions, harmony should be secured at any cost. We all know, too how important is the arrangement of departments with reference to one another for economy in handling goods, and how, in making changes, consisting of new buildings, etc., immediate wants are often short-sightedly consulted rather than the requirements of the future.

Lastly it should always be borne in mind that in these days of sharp competition the greatest saver of all, in labor, as in all other details of trade, is system.

Walter Zinn, special master commissioner, in the receivership of the Eastern Tube Co., Zanesville, O., has sent out notices to the bondholders that he is ready to pay the final dividend of 11 percent.

Tennessee Coal, Iron & Railroad Company's Report.

The annual reports of President D. H. Bacon and of Secretary and Treasurer L. T. Beecher, of the Tennessee Coal, Iron & Railroad Co. were presented on Tuesday, May 16, at the meeting of the directors in New York. They cover the year ending Dec. 31, 1904. We give the principal portions of President Bacon's report below:

"Up to the first of October, the year 1904 was one of low prices for pig iron, a very large tonnage having been sold on the basis of $9 for No. 2 foundry. Since Oct. 1 prices have been much higher, but the output of your furnaces has been restricted, owing to the strike of the union coal miners, which began in July and materially reduced the output of coal and coke. It was impossible to procure coke in any quantity outside, and in consequence a number of your furnaces were idle during the last six months of the year. The five furnaces at Ensley, however, which supply metal for the steel plant, not only have been kept continuously in operation but have made new high records for production at a much lower cost than in any previous year. This is the result largely of the improvements which had been installed during this and the preceding year. The new furnace which has been under construction at Ensley, known as No. 6, has been completed and is about to go into blast. This furnace, which is the largest owned by the company, as well as one of the largest in the South, is of the most modern and approved design and equipped with ample boiler and blowing power and the latest filling and stock-handling devices. We believe this furnace will be the largest single producer of iron in the South.

"The Ensley steel plant has had a very successful year. The output was largely increased over the preceding year, which is to be attributed to the improvements introduced, to which attention was called in my last report, and to the increased skill and efficiency of the organization in charge of the plant. The average monthly product of steel for the last six months of the year shows a gain of over 25 percent and for the last quarter, a gain of over 40 percent as compared with the year 1903, the product per month for October, November and December, 1904, exceeding 20,000 tons. The operations of your rail mill have demonstrated the ability of this company to produce successfully open-hearth steel rails of so superior a quality as to insure a market for all that the mill is able to produce, inquiries for the current year having far exceeded the supply. The mill was in steady operation during the entire year and besides increasing the output, which was over 16,000 tons of finished rails in December (exceeding by 100 percent the best month in 1903), developed a practice showing a relatively smaller percentage of second and imperfect quality rails than is attained by most other mills. The open-hearth department is being enlarged by the construction of another furnace, which will increase the product 2,000 to 2,500 tons per month. Necessary soaking pits and other improvements to handle the increased product are being built.

Blast Furnace and Iron Mine Betterments.

"The work of improving your properties, inaugurated by the present management, has gone forward steadily through the year, although no account of uncertain trade conditions during the earlier months comparatively little new work was undertaken. The completion of the new blast furnace and the additions to the equipment of the old furnaces at Ensley as well as the improvements at the Steel Plant have been alluded to. The progress of the comprehensive scheme for the entire re-equipment of the

red ore mines of your company, inaugurated in 1902, has been unavoidably slow by reason of the necessity of maintaining a steady output of ore to supply the needs of the furnaces. This work, however, has been completed during the year and these mines are now equipped as well as any like mines in the United States, and are in a position to furnish ore in such quantity as may be required and at greatly reduced cost. The ability of our mines to produce has so far exceeded the demands made by our own operations that we have been able to make sales of ore for the coming year to outside furnace interests on terms very advantageous to the company. The new shops at Muscoda and Fossil have already saved their cost several times over to the company in the promptitude and economy with which the repair work of the iron mines division has been performed, and they have enabled the management to build here many of its own mine cars and other underground equipment at a cost much below what would have been charged if purchased outside. Large stock pile grounds have been completed at Fossil mines Nos. 7 and 8 and the stocking of ore at these points has been begun. It is proposed to accumulate and carry from 100,000 to 150,000 tons in stock, which can be readily loaded into cars by steam shovel; this as a protection to the furnaces against a possible future shortage in ore supply due to labor difficulties. At your brown ore properties at Greeley, Ala., and Bartow, Ga., the work of development has been prosecuted with vigor, and a very large body of ore, sufficient for several years' operations, has been uncovered. The development of new territory will be kept well in advance of actual mining operations, but the properties are now so well opened up that the quantity of ore which can be produced is limited only by the furnace requirements.

"In the coal department advantage was taken of the idleness resulting from the strike to equip other of your mines in the Pratt field with electric haulage, pumping and coal cutting machinery, similar to that introduced in your Pratt No. 3 mine last year which has been so successful in increasing product and decreasing cost. This work is now approaching completion in Pratt mines Nos. 4, 5 and 8.

Coal Miners' Strike.

"The strike inaugurated by the United Mine Workers of America in the coal mines of your company, heretofore briefly alluded to, was the most important event of the year in its far reaching consequences to the company. Mining ceased July 1, when the existing scale expired, but a strike was not declared until August, negotiations between the operators and miners having failed. The nominal question involved was one of wages and rules, but the differences in these regards were slight, the real point at issue being vastly more important, indeed vital to the future prosperity and even the independent existence of this and similar manufacturing companies in the district. For years the authority exercised by the officers of this company over its coal mines has been growing less and less. The efficiency of the men, whether working by the day or on contract, was steadily declining and discipline had decreased with efficiency. The control the officers were able to exercise over the business of the company was far below what its owners and directors should expect or what is necessary for proper and economical operations. The conditions forced upon the management by the union had become intolerable. The authority of your representatives over the property in their charge, as to the manner in which the work should be done, as to what should constitute a fair day's work, and as to who should be employed, had to be restored and maintained, or all hope of permanent, successful competition with the products of other districts would have to be abandoned. Another important consideration arose from our desire to introduce electric coal cutting machines, similar to those in use in Pennsylvania, Ohio, and other northern States. We asked the union to allow us the same differential for machine mined over pick mined coal that is allowed by the union in Pennsylvania at corresponding mines. This was refused, the union officers offering us a differential nearly 50 percent less than is allowed by their organization elsewhere, it being clearly their intention to prevent the use by this company of coal cutting machines. Under the present non-union operations the machines have been introduced with most satisfactory results.

Union Limitation of Production.

"As illustrating the decreased efficiency resulting from union domination, I cite the Gamble mine of this company in Walker County, Ala. Since being made a non-union mine, the product per man per day has increased 1½ tons, and the earnings per man per day have increased 52½c. At the same time there has been accomplished a reduced cost per ton of product to the company. There has been no change either in the mine, the manner of working, or the equipment. The increased output and earnings are due solely to greater capability and effort on the part of the men. At all of our mines a small product per man was favored by the union, and at some of them, a man, no matter how skillful and industrious, was permitted to mine no more than the least efficient.

The company now has in its employ a sufficient force of miners. Many of the old employes have returned to work, and men have been attracted from other States by reason of the very satisfactory conditions of labor existing in this district. When the new men have acquired the necessary familiarity with location and conditions, when the completion of the mechanical improvements now being installed permit of the full resumption of the mines still idle, or in partial operation, it is confidently expected that normal conditions of product and cost will be restored.

"From the first it was very fully recognized what a strike would mean in the disorganization of operations and in loss of business and profits, but in all their efforts to free the company from the humiliating and arbitrary domination of a labor organization, your officers have received the constant and unanimous support of the board of directors, who were convinced that, if property was to be protected, the cost of a long strike was a necessary investment, and that the future gain to the company to be realized from the ability of the management to fully control its own operations, untrammeled by union restrictions, will be incalculable.

Ore and Coal Reserves.

"Early in the summer of 1904 a committee of appraisers was appointed, representing the Sloss-Sheffield Steel & Iron Co., the Republic Iron & Steel Co. and this company, to estimate the amount and quality of the coal and iron ore owned by each company. An examination covering several months was conducted, as the result of which a report signed by every member of the committee was submitted, showing that this company owns in fee over 395,000,000 tons of red ore, of which 381,000,000 tons are graded as first class, 10,177,000 tons of brown ore and over 1,623,000,000 tons of coal, of which 809,112,000 tons are coking coal. In the non-coking coal is included, however, 300,000,000 tons of Cahaba seam coal, which is unexcelled in Alabama or the South for steam and domestic purposes and commands the highest market price of any grade of coal in the district. The report of the appraisers further shows that of the total mineral holdings of the three companies, the proportion owned by the Tennessee company is represented by the following percent-

ages: Red and brown ore (all grades), 77.4; first class ore, 8.6; coal, 68.2; coking coal, 64.8. The men in charge of your iron mines estimate the holdings of iron ore of your company to be still larger, viz.: of first class red ore, over 450,000,000 tons; of second class red ore, over 95,000,000 tons; and of brown ore, 16,900,000 tons. From the iron ore owned in fee by this company as many tons of pig iron can be made as from all the ore that has been shipped from the Lake Superior region from 1855 to 1904, inclusive; and, assuming that your furnaces in Alabama make 700,000 tons of pig iron per year, it would require 200 years to exhaust your supply of coking coal and first class red and brown ores. The company owns in addition many thousands acres upon which no explorations for minerals have ever been conducted, and it is not improbable that some of these lands may hereafter be found to contain a large tonnage of ore and coal.

Construction and Improvement.

"Several points in the report of the secretary and treasurer deserve particular comment. During the past year, in spite of the heavy expense and incidental loss due to the coal strike, and the heavy disbursements for construction and improvement, the working capital of the company has nevertheless been fully maintained. During the years 1902 to 1904, inclusive, the sum of $4,024,281.75 has been expended for repair and maintenance account, the entire sum being charged to cost of operations. In proportion to our equipment this sum is very large and indicates that, in addition to ordinary current repairs, the condition of your property has been improved by the expenditure of a large sum, which, while charged to cost, might under less rigid accounting have properly been charged to capital account.

"During the last four years, or since the present management was given charge of the properties of your company, expenditures for new construction amount to $5,512,232.65, and for the purchase of mineral lands, the consolidation of our holdings, the correction of title, and the conduct of explorations preliminary to development, a further sum of $401,006.79 has been expended, a total of, approximately, $6,000,000.00. After deducting the proceeds of properties sold, a net sum exceeding five and one-quarter millions of dollars has been expended for this purpose. This entire sum has been provided out of net earnings of the company for the period, for though the bonded debt has been increased, the current liabilities have been correspondingly decreased and nearly $2,000,000 of marketable securities of the company are held in the treasury, so that the net indebtedness of the company, fixed and floating, shows an actual decrease on Dec. 31, 1904, as compared with Jan. 1, 1901.

Financial Statement.

The statement of income account for the fiscal year ending Dec. 31, 1904, contains the following:

Gross sales and earnings		$9,535,404 12
Deduct:		
Cost of operating (labor, materials, freight, etc.)	$6,300,286 73	
Repairs and maintenance	1,213,844 44	
General expense, administration, taxes, insurance, etc.	458,475 74	
		7,972,606 91
Net earnings from operation		$1,562,797 21
Deduct:		
Interest on T. C. I. & R. R. Co. general mortgage 5% bonds	$150,055 69	
Interest on T. C. I. & R. R. Co. Birmingham division 6% bonds	242,555 00	
Interest on T. C. I. & R. R. Co. Tennessee division 6% bonds	70,115 00	
Interest on DeBardeleben Coal & Iron Co., 6% bonds	163,740 00	
Interest on Cahaba Coal Mining Co., 6% bonds	53,520 00	
Interest on Ala. Steel & Ship Building Co., 6% bonds	43,800 00	
Dividends on Ala. Steel & Ship Building Co. preferred stock	11,855 00	
Other interest	20,647 49	
Premium paid on securities purchased	5,015 00	
Miscellaneous profit and loss items	280 06	
		761,583 24
Net profits		$ 801,213 97

Deductions for depreciation are $114,427.60 royalty fund and $141,797.68 replacement fund. For the sinking fund on T. C. I. & R. R. Co. general mortgage 5 percent gold bonds the deduction is $48,730; for dividends on preferred stock, $19,006.23. The surplus for the year is thus $477,252.46. On Dec. 31, 1903, the surplus was $1,734,162.50, from which a deduction of $89,080 was made for sinking fund for 1902 and 1903 on the general mortgage 5 percent gold bonds, leaving a balance of $1,645,082.50. Adding the surplus for 1904 gives a total surplus Dec. 31, 1904, of $2,122,334.96.

The general balance sheet is as follows:

GENERAL BALANCE SHEET, DECEMBER 31, 1904.

ASSETS.

Property account			$36,122,436 08
Balance of this acct. as on Dec. 31, '03		$35,235,638 17	
Viz.: Mineral and other lands	$26,047,005 28		
Plant and equipment	9,188,632 89		
Charges to capital acct. in 1904		1,232,103 19	
		$36,467,741 36	
Less: Charged off to the following acounts, viz.:			
To depreciation fund	$256,225 28		
To bond sinking fund	89,080 00		
		345,305 28	
Investments			297,305 94
Trustees of bond sinking funds			54,103 79
Treasury securities			1,995,000 00
T. C. I. & R. R. Co. general mortgage 5% bonds		$ 1,347,000 00	
T. C. I. & R. R. Co. B'ham & Tenn. division bonds		11,000 00	
T. C. I. & R. R. Co. preferred stock		20,000 00	
Ala. Steel & Ship Building Co. bonds		370,000 00	
Ala. Steel & Ship Bldg. Co. pref. stock		247,000 00	
Current assets			1,614,386 35
Cash		$ 463,108 44	
Bills and accounts receivable		1,151,277 91	
Inventory accounts			1,442,789 44
Products, raw materials, supplies, and live stock on hand and merchandise in commissary stores			
			$41,526,021 60

LIABILITIES.

Capital stock			$22,801,100 00
Common		$22,552,800 00	
Preferred		248,300 00	
Bonded debt			13,693,000 00
Bonds of T. C. I. & R. R. Co.		$14,057,000 00	
Less: Redeemed and held by trustees of sinking funds		364,000 00	
Guaranteed securities of proprietary comp'y			1,540,000 00
Ala. Steel & Ship Bldg. Co. bonds		$ 1,100,000 00	
Ala. Steel & Ship Bldg. Co. pref. stock		440,000 00	
Reserve and provisional funds			256,056 21
Bad debts reserve fund		$ 132,364 40	
Sundry insurance funds		80,967 22	
Relining fund		42,724 59	
Sinking fund on gen'l gold bond mortgage			48,730 00
Current liabilities			1,064,800 43
Bills payable		$ 150,000 00	
Accrued interest and unpresented coupons		329,185 01	
Audited vouchers, pay rolls, etc.		582,571 42	
Proportion of dividend on preferred stock		3,044 00	
Surplus			2,122,334 96
			$41,526,021 60

The charges to capital account in 1904 referred to in the above consist of $605,078.66 spent on new blast furnace and equipment, and improvements at old furnaces; $247,272.76 for iron mine development and equipment; $177,303.42 at coal properties; $139,517.04 at Ensley steel works for hot metal mixer, etc.; $5,103.98 at Bessemer rolling mill, and $57,827.33 for land purchases.

For four years ending Dec. 31, 1904, the net increase in property account was $5,346,295.61. In addition to this there was expected in the same period at the several plants for current repairs, renewals and general maintenance, all of which was charged to cost of operating, a total of $1,213,844.44.

The total paid in salaries and wages in 1904 was $5,041,246.37. There were employed an average of 8,680 persons distributed as follows: furnace and manufacturing plants, 2,925; coal mines and coke ovens, 3,974; iron mines and limestone quarries, 1,701; miscellaneous, 80. The production statement for 1904 as follows in tons:

PRODUCTION OF RAW AND FINISHED MATERIALS IN 1904.

Iron ore. Red ore (Red Mountain mines)		1,095,432	
Brown ore (Greeley mines)		69,541	
Brown ore (Bartow mines)		43,065	
Total			1,208,038
Coal for conversion into coke		1,331,063	
Coal for general market or consumption		1,425,237	
Total			2,756,300
Coke			871,532
Limestone and dolomite			218,484
Blast furnace product. Foundry and basic pig iron			475,314
Steel Works. Open-hearth steel ingots			176,657
Blooms, large billets and slabs		14,102	
Rails		124,496	
Total finished product			138,598
Bessemer rolling mill product. Muck bar			2,724
Bar iron and steel		9,958	
Plates		6,710	
Total finished product			16,668

PRESIDENT MATHER TO MINING ENGINEERS.

President Wm. G Mather, of the Cleveland-Cliffs Iron Co., Cleveland, delivered the class day address to the graduates of 1905 of the Michigan College of Mines, Houghton, Mich., on the evening of May 5. The speaker discussed the importance of the mining engineer's profession, and dwelt upon his equipment, the qualities that make for success and the place he should take in the life of the community. From the portions of the address dealing with the wonderful development of the mineral industries of the United States and the raising up of a trained body of engineers to cope with the problems presented by the material advance of the past 20 years, we take the following:

As having the honor to represent the management of one of the large mining corporations actively engaged in the production of Michigan's iron ore, I naturally feel an interest in this institution fostered by the State for the production of men trained to the art of mining. We are in a real sense partners one with another. Your institution was founded in 1886, mine in 1850. My company shipped the first cargo of iron ore through the Sault Ste. Marie Canal, whose semi-centennial is about to be celebrated this year. Our activities, therefore, preceded yours by 36 years, and we feel that we accomplished much during that time, in spite of the fact that practically no help was derived from the trained engineer. We must not forget that the path of the engineer was prepared beforehand by the hardy and intelligent pioneers and practical miners who opened and developed the great iron and copper mines of Marquette County and Houghton County; and that they have been the nursery out of which swarmed the able men who opened up successively the other wonderful mineral districts of the Lake Superior country. The geologist himself owes them a debt, and even now he is greatly helped and informed by the adventurous and optimistic practical explorer and miner, who frequently ventures into places which the geologists, though they do not fear, sometimes think it unnecessary, to tread. You will never, therefore, fall into the foolish error of undervaluing the work of the practical miner, who though untutored in a technical school, may have been so trained in the practical one of life as to be sometimes superior even to those who are emerging, and have emerged, from these scholastic halls. Let me state briefly some of the developments of recent years.

In 1886, when this College of Mines was established by the State of Michigan, the value of all metal products in this country, as classified by the United States Census, was $214,897,825; in 1903, $624,318,008. In copper alone, the respective values of these two years were $16,527,651 and $91,506,006. In iron ore, for 1889, $33,351,978, and for 1903, $66,328,415. The Lake Superior product in 1886 comprised 36,124 tons of copper and 3,565,144 tons of iron ore; and in 1902, 76,189 tons of copper and 27,571,121 tons of iron ore. The world's production of copper in 1886 was 217,086 tons, and in 1902, 529,864 tons, an increase of 312,778 tons, of which 206,342 tons was contributed by the United States. In 1894 the United States produced of iron ore 11,876,679 tons; ten years later, in 1903, 35,019,308 tons. And our great and growing rival in iron and steel and in all other industries, Germany, produced for the same periods 12,392,065 and 21,230,639 tons.

In 1889 the Lake Superior region produced 51.8 percent of all the iron ore mined in the United States, and 75.8 percent in 1903. In 1886, six leading Lake Superior iron and copper mining companies employed 8, and in 1904, 29, technically trained men. Six leading old range iron mines produced their ore at an average cost of $1.76 per ton in 1890, and $1.17 in 1904, with an average product in tons per man per day in those respective years of 1.88 and 2.77. In 1890, seven mining schools in the United States had an enrollment of 328, which had increased in 1904 to 1,438, and the graduates in those years were 23 and 183. In 1887-8 this college graduated 7 men, and in 1904-5 46 men; and her 244 graduates are located in 39 states and foreign countries, including Cuba, France, Japan, Mexico, Newfoundland, Peru, Nicaragua, Russia, Africa, and the Yukon.

These few facts are brought to your attention simply to emphasize the changes and progress in your chosen industry during the few years marking the life of this college. I am told that there is an annual call for many more mining engineers than are being turned out. This demand will continue, not only from the growth of the industry, but from the gradual tendency in established mines to put technically trained men into the places heretofore filled by the so-called practical miner. You young men, therefore, graduates and undergraduates, need not be anxious as to getting immediate employment. With the usual modesty and lack of self-confidence characteristic of the college man, you may have had your doubts on this point, but I have traveled 800 miles to reassure your minds. You do not need to be content with the encouragement given to the men rushing into the already crowded ranks of lawyers and doctors,—that "there is plenty of room at the top;" it is all top with you just now. Furthermore, it is well to bear in mind that mining is by no means at its zenith; in fact I believe it is only in the early stages of its development, not only in our own country but throughout the world, with the exception, perhaps, of some of the well developed countries of Europe.

Then again let us rejoice in the greater regard felt by the world for the status of the mining engineer's profession, in fact for all so-called engineers. It is not long since the academic students in our colleges considered themselves in a class superior to those studying in the scientific departments, and the degree of B. A. was much more sought than that of B. S. or M. E. I read in a recent article written by an Englishman, that this point of view towards the profession of engineering, deterring as it did many young men from entering its ranks, was one of the most potent influences in holding back the scientific and industrial progress of England as compared with the much greater growth of rival countries in recent years, particularly, of Germany and the United States. But this estimate of the seekers after the two different kinds of degrees is passing, or rather has already passed entirely away in this country; not only because the more practical world is calling for you and must have you, but because you have also given more thought to your education than formerly, realizing that time and thoroughness in an engineering course give culture and all-round ability, as well as and more than that education which fits for nothing in particular.

Prof. Christy, of California University, calculates that in 1889, the actual value produced by all engaged in the mining industry per capita, was $981; per miner engaged, $2,900; per administrative officer, $23,020; per estimated engineer, $97,872. If each captain of the mining industry actually superintends and controls an average production of nearly $100,000.00 per annum, is it not important to the nation that he be thoroughly trained, and that into this training should go all that modern science can give, to make them sufficient? The farmer can harvest his crop year after year; most of the increase comes from sun and

rain, and by fertilizing now and then his farm remains a source of wealth from generation to generation. Not so with mines. The crops that the miner reaps can be harvested but once, and what he leaves behind through lack of skill is forever lost. It is plain, therefore, why a large mining company is often justified in paying an experienced mining engineer the very large salary they often receive; but it is also an occupation where inefficiency, and weakness of body, mind, or character, are signal disqualifications. Prof. Christy is an enthusiast on mining. He says: "Agriculture and mining are the only fundamental arts. Without agriculture existence would be precarious; without mining, civilization impossible. The little army of miners is no longer insignificant. Who can withhold from its members an involuntary tribute of respect, when we view the smallness of their number and the importance of their work; when we reflect upon the uncertainties, the hardships, the dangers, which surround them—the explorers of another world; sailors who drive through seas of solid rock; soldiers whose daily task is a battle with difficulties, dangers, and sudden death; the advance guard of civilization, the salt of the earth."

Mining engineering requires a broader training than any other engineering branch, as it must embrace mechanical, electrical, and civil engineering, as well as applied chemistry and mineralogy. There is no longer any question as to the value and necessity of technical training. If you do not outstrip the so-called practical miner, it will be because you have not taken advantage of your training here, and are unwilling to work and apply it. Let me quote again, this time from President Alderson, of the Colorado School of Mines: "The relations which the engineer will bear to the great political and industrial changes, are many and important. The coming era of industrial regeneration will be the result of a more accurate knowledge of science and a closer application of its principles. The engineer will be the missionary; the mechanic, the technical man, not the farmer, will be the pioneer. The warfare of the future will be industrial and political rather than military. The great changes in the economic and industrial life of the twentieth century will be the work of the engineer, and upon his efficiency depends commercial supremacy."

You may be summoned by our government to aid in developing the mineral wealth of our new possessions, and thus have the honor and privilege of collaborating in making successful the great ventures we are making in trying to elevate, materially and morally, these wards of our country. The American mining engineer has made for himself a great name, not only for his splendid development of our own resources but also on account of his notable achievements in other parts of the world. An Englishman in the November, 1904, *Science* says: "The whole of the gold mining industry is practically under the direction of American engineers, and England's own mines yield fully 75 percent of the gold output of the world, and the American form of administration has been introduced into this industry almost universally."

I congratulate you upon having chosen this honorable, interesting, and lucrative profession, and upon being graduated after a four years course of study in this fine institution, directed by so learned a faculty, and a president so honored and able as Dr. McNair. I am convinced that you are well equipped for a successful career, which you are fortunate in entering upon in such auspicious times. Nevertheless, all this fine training, all the advantages offered by the pursuit itself, will not avail to bring you success, unless you devote yourselves to it with energy, honesty, and singleness of purpose. You have only just begun your course. Your alma mater is only 18 years old; and when 18 years more have passed over your heads you will still be young, at least you will think so when that time comes; I can assure you of that, although now you may think that men of that age are nearing the end of their field of activity. Do not therefore, set your heart on immediately securing positions of responsibility. You are still deficient in three things which are essential to the man in authority; first, the art of mining, that is, knowledge of those practical details of mine work which must be learned underground, and not from lectures or text-books; second, business experience; third, the art of bossing. What better way to learn all of this than by spending a certain period of time underground, doing a miner's work, equipping yourself by actual experience to know what is the daily capacity of a man and a drill in any kind of ground as soon as you see it, and not to be deceived when systematic efforts (to which the careless or conniving shift boss or even captain are sometimes accessory) are made to prove that a day's work is required for results that can or should be accomplished in much less time. You will thus appreciate by actual experience with the miners and laborers themselves, the kind of supervision and the method of letting contracts and setting rates of wages and hours of work, which will enable and stimulate the men, who are hid away from the manager's sight almost if not all of the time, to do their best work for their employers and themselves. You will know likewise from the same hard but accurate school just how supplies are wasted, how mistakes are covered up by the engineers, the timekeepers, the mechanics; how the employer is cheated in numberless small and sometimes large ways; how on the other hand the men are themselves cheated or abused or neglected by ignorant (or worse) bosses, until perhaps the first thing the manager knows about it is through the declaration of a strike, or a cave-in, or a death. A year or two after graduation spent in this way, and in the shop or office, of course on small pay, would, in my opinion, be the best thing you could do for yourselves, and at the end of ten years would be recognized by you as being the most effective of the ten towards gaining the position of superintendent, or of chief engineer; or of manager, which I hope you will all occupy at the end of the next 10 or possibly 15 years. But few men, unfortunately, have the courage to resist a tempting position and remunerative pay and to take their place in this system of apprenticeship. But, "those few among the graduates of technical schools who have come to us," says the manager of a very large organization, "who have done this, have in almost every case achieved brilliant success." Repress that common failing of the graduate, viz., his abounding self-confidence and his pity for the "old man" (that is, the mining captain or the manager) who he thinks has gotten into a rut. Consider what you can learn from contact with such men, who, without any of your educational advantages, have or may become Joseph Sellwoods, D. H. Bacons, Samuel Mitchells, Thomas Walterses, T. F. Coles, Walter Fitches, W. E. Parnalls, John Duncans or Graham Popes. Consider further the education you will receive in knowledge of human nature and human conditions, from contact with those hardy sons of toil, whose wages constitute 70 percent of the mining cost and whose habits and characteristics you therefore ought to know.

The Crist Valve Mfg. Co., New York, is looking for a site with adequate shipping facilities and other inducements for the manufacture of a full line of brass gates and other valves for steam, water and gas. The machinery and tools have already been selected.

BUSINESS ON THE BIAS.

BY JOHN DRUMMOND.

Management is the mass, of which method is the make-up in detail. And it does not follow that because the plan is comprehensive the system is therefore the more admirable. There are systems and systems. Some are just sprinkled over the business; in others there is a slim coating. Then there are others—others with system to saturation. System is the red tape of the other fellow. We know better, of course. But it is quite funny, when you think of it, that most systems—sane, sound and satisfactory or, on the other hand, shaky, slap-dash schemes—are often used by the least methodical of men. It is so easy to yearn for perfect records, mental assistance, reminders and ready resource of any and all kinds, and oh, yes, let Bill take care of it. Bill doesn't do much and gets mighty little for it; he is just the man for the job.

Something of this sort is suggested by the advertisement of a firm engaged in business betterment. The ad shows the before and after taking symptoms and the sunny results when seven records were united to prove that index cards and cabinets don't make a card system of the serviceable sort. "No more card system for me. I put one into my factory a year ago—a cost system. Every job going through is entered on seven separate cards. Not one of my workmen can blow his nose without recording it on a card. I've taken on two extra clerks to keep the thing running; and it's just as hard today to get the facts I want as it was a year ago." It's within the bounds of probability that this mismanagement man had never tried the card index treatment on himself. A bunch of blanks with a desk set of date cards will quickly show the workings of one remedy for business remission. And from this simple stage to the most elaborate shop and office system is a matter of development. Moreover, the transition cannot be too rational. Just why a man will dump card complications on to his business with less investigation than he would give to the hiring of a clerk, is a puzzle.

Out of the batch of blunders may come some benefit, as was the case of the grouchy journeyman and the apprentice. The old fellow was a taciturn Scotchman and when he ordered the youngster to bring a spirit level, the request conveyed no details. A flask of whiskey was tendered in reply as the nearest thing the boy could bring to fill the bill. And it promptly became useful.

I have on my desk another reminder of these things that are nicely contrived, well loaded and carefully adjusted, but just miss the bull's eye. It is an illustration designed to show up in a telling way the time waste of machine tools while machinists march to the emery wheel or grindstone. The object is praiseworthy enough and the accompanying argument for a grinding insurance to protect the highly productive from poor tools is timely. The whole thing is by no means bad as an advertisement. At a glance the reader may be attracted, then interested and finally convinced and this triple combination is doubtless the gist of all successful publicity. The artist has tried to convey the idea that valuable machinery may be tied up and so rendered unproductive. He attempts this by running a rope around a machine tool and then fastening the ends by a prominent knot. The bed and housings are circled with rope, sure enough, but the table, levers, hand wheels, gears, etc., are left free to work. Like the whiskey substitute for the spirit level, it is not quite as it might be, but there are compensations.

There is an office system which surrounds and sustains a great and growing business. It has been brought to high efficiency by careful pruning of the non-essentials and is at once simple and sufficient. Cross-questions, explanations oft repeated, interdepartment interruptions and misfit expedients are rare and work is shorn of wasteful worry by a practice which brings the duties of many men to each at the right time. Much of this is a matter of pardonable pride and is exhibited with unction to the elect. One thrifty soul has seen this satisfactory solution and applied it to his own troubles. He has even added greater detail and rejoices in applying to a one-man business a procedure planned for the peace of many.

There are cases where a risky remedy is worse than the disease. Such is the condition where procuring a pencil has more preliminaries than the discharge of an office boy. For instance, you need a box of pins. These pins are economically bought in bulk, doled out on requisition, with a boy thrown in to stick the assortment one by one in the empty receptacle—a five-dollar expenditure on a five-cent job is system run to seed. Economy of effort marks the judicious adjustment of means to an end. I have seen a heavy traveling crane carry a handful of waste on a 300-ft. trip, but neither crane man, stock-keeper nor recipient paid for it. That was where the other fellow came in.

Industrial News.

The Art Metal Construction Co., Jamestown, N. Y., will erect additions this year greater than its present plant. Bids were opened May 15.

The Western Inspection Co., Buffalo, N. Y., manufacturer of fire extinguishers, is about to build a new two-story brick building in the near future. Details of construction and machinery have not been determined.

The Springfield Boiler & Mfg. Co., Springfield, Ill., whose plant was recently visited by fire, intends to rebuild at once, but plans have not been completed. Approximately, the new building will be 350 ft. long, main span, 50 ft., bays on each side, 40 ft. deep. The main span will be topped by an electric crane 35 ft. above the floor level.

The Davenport Foundry & Machine Co., Davenport, Ia., is about to improve its plant, which will include a large brick foundry just west of its present location. Another story will be added to the machine shop, giving additional space for the pattern shop.

Mark Elliott, of Marquette, Mich., has been appointed receiver for the Kloman Mining Co., with $50,000 bonds. The company has not been in active business for several years, and its property, which lies near the Republic mine, has been idle.

The Western Wheeled Scraper Co., Aurora, Ill., has decided to double the capacity of its plant before the close of the summer. Plans call for the erection of a machine shop, 50 x 260 ft. Contract for the steel has already been let.

The Vulcan Foundry Co., Hamilton, O., has purchased land for the erection of a new foundry, and expects to be under roof by November.

The city of Nevada, Mo., has given a bonus of $10,000 to the Kansas City, Nevada & Springfield Railroad Co., for the erection of its passenger and freight depots, machine shop, car shop and roundhouse.

The David Bell Engineering Works, Buffalo, N. Y., have just shipped to the Isthmian Canal Commission three of their new type of reinforced column steam hammers. They have also shipped hammers of this type to the Boston, New Orleans, and Mare Island navy yards, as well as to many of the leading railroads and manufacturing concerns.

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., is about to acquire the controlling interest in the Waterbury Machine Co. There will be no change in the organization and it will be under the same management as heretofore.

The National Corundum Wheel Co., 110 Franklin street, Buffalo, has selected a site for a new building on Main street and the Erie railroad. Plans anticipate the erection of a building, 40 x 125 ft., two-stories high, constructed of cement blocks; something new to Buffalo. This company is the only manufacturer of corundum wheels, owning and operating its own mines, which are located in the Ontario corundum belt.

COAL PRODUCTION OF THE UNITED STATES IN 1904.

Practically complete returns to the United States Geological Survey for 1904, as collected by Mr. Edward W. Parker, statistician, show that the production of coal last year amounted to 351,196,953 short tons, having a total value at the mines of $445,643,528. Compared with 1903 this shows a falling off of 6,159,463 short tons in quantity, and of $58,080,853 in value. This decrease was simply a natural reaction from the abnormal activity which had been maintained in 1903, due to the exhaustion of coal stocks by the memorable strike of 1902. Prices raised high by the famine of 1902 remained high for a large part of the year, and the total value of coal at the mines, before any expense of transportation or selling costs had been added, amounted to $503,724,381, an increase of $136,600,000 over 1902.

The production in 1904, while less than that of 1903, exhibits a normal increase when compared with the annual production during the 10 preceding years. The average price for all coal mined and sold in 1904 was $1.27, as compared with $1.41 in 1903, and $1.22 in 1902.

The statistics for the production of anthracite in Pennsylvania, which are complete, show that the output in 1904 amounted to 65,318,490 long tons, or 73,156,709 short tons, valued, at the mines, at $138,974,020, as compared with 66,613,454 long tons, or 74,607,068 short tons, valued at $152,036,448 in 1903. The decrease in production in 1904 therefore amounted to 1,294,964 long tons, or 1,450,359 short tons, while the falling off in gross revenues amounted to $13,062,428.

One of the interesting features in connection with the anthracite trade is the constantly decreasing proportions of the large or more profitable sizes of coal sent to market, and the equally constant increase in the proportions of small or less profitable coal. In 1890, 77 percent of the shipments from the anthracite regions consisted of sizes larger than pea coal, and 23 percent represented the shipments of pea coal and smaller. In 1904 the large sizes made up only 62 percent of the total, while the small sizes had increased to 38 percent.

The recovery of usable coal from the old culm banks by washing has furnished some of this increase in the shipments of small sizes, and the installation of washeries at the breakers for saving the small sizes in the primary preparation of the coal has done more. The recovery from the old culm banks has averaged about 2,500,000 long tons annually during the last four years.

The statistics of bituminous coal production comprise all varieties except Pennsylvania anthracite, and include semi-anthracites, semi-bituminous, cannel, splint, and block coals, and brown and black lignites. The small production of anthracite in Colorado and New Mexico is also excluded in the bituminous output. In 1904 the aggregate production of all these varieties amounted to 278,040,244 short tons, valued at $306,669,508, against 282,749,348 short tons, worth $351,687,933 in 1903 indicating a decrease of 4,709,104 tons in amount and $45,018,425 in value. The average price a ton for all coal mined and sold, including colliery consumption, fell from $1.24 in 1903 to $1.10 in 1904.

Among the 31 states included in the above table there were only 10 in which there was an increase of production in 1904, and these 10 include the State of Nevada, which is credited with 150 tons in 1904 and had no production during the preceding year. Of the more important producing States, West Virginia, Indiana, Kentucky, Iowa, Kansas, and Wyoming were the only ones that showed an increase in production in 1904. The only important increase was made by West Virginia, whose output in 1903 was curtailed by labor troubles, and whose gain in 1904 amounted to 3,000,000 tons.

The following table presents a comparative statement of production in 1903 and 1904, by States, with the increases and decreases for each in 1904.

PRODUCTION OF COAL IN 1903 AND 1904, BY STATES.

State.	Short Tons. 1903.	1904.	Decrease.
Alabama	11,654,324	11,163,194	491,130
Arkansas	2,229,172	2,009,451	219,721
California and Alaska	105,420	75,388	30,032
Colorado	7,423,602	6,594,295	829,307
Georgia and N. Carolina	434,260	400,191	34,069
Idaho	4,250,	3,330	920
Illinois	36,957,104	35,990,796	996,308
Indiana	10,794,692	10,929,908	*135,216
Indian Territory	3,517,388	3,011,972	505,416
Iowa	6,419,811	6,542,005	*122,194
Kansas	5,839,976	6,322,875	*482,899
Kentucky	7,538,032	7,559,940	*21,908
Maryland	4,846,165	4,819,171	26,994
Michigan	1,367,619	1,338,447	29,172
Missouri	4,238,586	4,187,197	51,389
Montana	1,488,810	1,359,409	129,401
Nevada	.....	150	*150
New Mexico	1,541,781	1,452,183	89,598
North Dakota	278,645	269,297	9,348
Ohio	24,838,103	24,415,054	423,049
Oregon	91,144	111,540	*20,396
Penna. (bituminous)	103,117,178	97,916,733	5,200,445
Tennessee	4,798,004	4,782,302	15,702
Texas	926,759	1,072,194	*145,435
Utah	1,681,409	1,491,607	189,802
Virginia	3,451,307	3,576,092	*124,785
Washington	3,193,273	3,135,757	57,616
West Virginia	29,337,241	32,332,385	*2,995,144
Wyoming	4,635,293	5,177,381	*542,088
Total bituminous	282,749,348	278,040,244	*a* 4,709,104
Pennsylvania anthracite	74,607,068	73,156,709	*a* 1,450,359
Grand total	357,356,416	351,196,953	*a* 6,159,463

a Net decrease. * Increase.

The growth of the coal-mining industry during the last 25 years is shown in the following table:

ANNUAL PRODUCTION OF COAL IN THE UNITED STATES, 1880-1904.

Year.	Quantity. Short tons.	Value.
1880	76,157,945	$ 95,640,396
1881	85,881,030	124,349,380
1882	103,285,789	146,632,581
1883	115,212,125	159,494,855
1884	119,735,051	143,768,578
1884	111,159,795	159,019,596
1886	113,680,027	154,600,176
1887	130,650,211	182,498,737
1888	148,659,407	190,881,012
1889	141,229,613	160,226,323
1890	157,770,963	176,804,573
1891	168,566,669	191,133,135
1892	179,329,071	207,566,381
1893	182,352,774	208,438,696
1894	170,741,526	186,141,564
1895	193,117,530	197,799,043
1896	191,986,357	196,640,166
1897	200,229,199	198,897,178
1898	219,976,267	208,023,250
1899	253,741,192	256,094,234
1900	269,684,027	306,688,164
1901	293,299,816	348,926,069
1902	301,590,439	367,032,069
1903	357,356,416	503,724,381
1904	351,196,953	445,643,528

The Tennessee Coal, Iron & Railroad Co.'s No. 6 furnace put in blast April 29 will make 300 tons of basic iron a day with local ores and coke. It is 85 ft. high, 20 ft. 9 in. at bosh, and has 14-ft. crucible. It is equipped with Brown top, and a double skip; Scott bosh blocks; four 93 x 20 Kennedy stoves; 10 250-h. p. Wickes vertical boilers; 2 3,000,000-gallon Prescott pumps; 4 Mesta blowing engines, 2 high pressure 44 x 84 x 60 and 2 low pressure 84 x 84 x 60; and the Uehling pyrometer is used.

President James J. Hill, of Northern Securities, when asked about his negotiations with the Tennessee Coal, Iron & R. R. Co. for rails for the roads, which policy he directs, replied that the company makes an open hearth rail, which he likes and which will be given a trial.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers :—

The Weatherford Machinery & Foundry Co., Austin, Texas, has increased its capital stock from $10,000 to $20,000.

The Globe-Engineering Co., Dayton, O., has been incorporated with a capital stock of $100,000. The incorporators are: Joseph D. Chamberlain, Theo. D. Friend, Abraham F. Bowman, Frank B. Heathman and Irley E. Jones.

The Union Tool Co., Boston, Mass., has been incorporated to manufacture wrenches, etc.; capital, $20,000. The officers are: President, Wellington L. Haller, 310 Commercial street, Boston; treasurer, Frank C. Allen, 100 Boylston street, Boston; clerk, Joseph C. Hosher, 120 Liberty street, New York.

The Moffat Mfg. Co., Charlotte, N. C., has been incorporated.

The Stayman Mfg. Co., Jersey City, N. J., has been incorporated with a capital stock of $250,000. The company will take over and continue the business of David F. Staymann in the manufacture of steam engine appliances, etc. The incorporators are: Clarence A. Weymouth, John L. de Saulles and David F. Staymann. The office of the company is at 240 Eleventh street.

The Trojan Toe-Calk Co., Troy, N. Y., has been incorporated to manufacture blacksmiths' supplies. The capital stock is $50,000. The incorporators are: Robert H. Watkins and Michael R. Murray, Cambridge, Washington county; William Hogen, Thomas L. Watkins and Charles Hogen, Troy.

The Atlas Steel & Iron Co., Camden, N. J., has been incorporated to manufacture iron and steel, mine coal, iron and other metals, etc.; capital, $125,000. The incorporators are: George J. Hemmer, M. Wiegand, M. W. Darnell, Camden.

The B. F. Starr Co., Baltimore, Md., has been incorporated by Benjamin F. Starr, Wilson Thomas Starr, Jasper Y. Jones, William C. Kirby and Thomas Ireland Elliott. The company will deal in mill machinery. The capital stock is $50,000.

The Covina Machine Works, Covina, Cal., has been incorporated with a capital stock of $10,000. The directors are: C. F. Clapp, J. R. Hodges, T. J. Gunn, Chas. A. Gauldin, Charles Madison, all of Covina.

The Lorain Sheet Metal & Cornice Co., Lorain, O., has been incorporated with a capital stock of $6,000. The incorporators are: Calvin A. Weimer, H. G. Schreiner, W. F. Hampfiner, C. C. Heffelman and Leonard M. Hampfiner. The company has a patent cornice and will place its product on the market at once.

The National Railways Materials Co., New York City, has been incorporated to manufacture railroad tracks and track materials. The incorporators are: George L. Hall, New York City; Lawrence Griffith, Yonkers; Francis L. Field, New York City.

The Baltimore Engine Co., 310 Market street, Camden, N. J., has been incorporated with a capital stock of $100,000 to engage in the business of mechanical and electrical engineers, machinists, etc. The incorporators are: Harry S. Roop, 327 North Calvers street, Baltimore; John Harris and William Harris, 310 Market street, Camden, N. J.

Kings County Iron Foundry, Brooklyn, N. Y., has been incorporated to manufacture foundry articles; capital stock, $75,000. The incorporators are: Edward A. Calahan, 215 Cumberland street, Brooklyn; Henry L. Schmittman, 341 Carlton avenue, Brooklyn; Theodore L. Hermann, 30 Broad street, New York; Margaret A. Loughran, 214 Carlton avenue, Brooklyn.

The Romberger Nut Lock Co., 147 East State street, Trenton, N. J., has been incorporated with a capital stock of $100,000. The incorporators are: L. E. McKain, James K. Neogley, Mark G. Hibbs, all of 147 East State street, Trenton. The company will manufacture nut locks, bolts, fasteners, washers, rivets, etc.

The Aiton Machine Co., First and Middlesex streets, Harrison, N. J., has been incorporated to manufacture engines, machinery, etc., and to engage in the business of mechanical and electrical engineers. The capital stock is $200,000. The incorporators are: Gardiner C. Sims, Providence, R. I.; Arthur T. Boves, Glen Ridge, N. J.; Thomas A. Aiton, Cleveland, O.

The Iowa Fence & Iron Works Co., Carroll, Ia., has been incorporated. The capital stock is $100,000.

The Illinois Corrugated Steel Co., Bloomington, Ill., has been incorporated to manufacture corrugated culverts, bridge arching, etc. Russell Woolridge and C. D. Voris are the incorporators.

The Lovell Mfg. Co., New Haven, Conn., has been incorporated with a capital stock of $250,000. The officers are: President, Pierpont P. Foster; secretary, A. K. Lovell; treasurer, Hermann Laufer. The company will shortly secure a plant and begin the manufacture of a special steel wire chain.

The East St. Louis Locomotive & Machine Shop Co., East St. Louis, Ill., has increased its capital stock from $30,000 to $100,000.

The Ceramic Machine Co., Middletown, O., has been incorporated by S. J. Sorg, Harry Waldburg, F. E. Goldsmith, J. W. See, and William Lawy. The capital stock is $100,000.

The Mason Heater & Foundry Co., Bellaire, O., has been incorporated. The incorporators are: T. C. Nicholson, August Schick, John Schick, J. A. Futhey, Emil Schmidt. The capital stock is $25,000.

The National Tool Co., Cleveland, O., has been incorporated with a capital stock of $50,000. The incorporators are: J. F. Castle, Robert Bowle, C. G. Reynolds, C. R. Bussell and G. M. Parks.

The Adjustable Lock Wrench & Tool Co., Guthrie, Okla., and Chicago, Ill., has been incorporated with a capital stock of $100,000. The incorporators are George C. Clark and Edward Zulauf, of Chicago, and G. V. Pattison, of Guthrie.

The Evansville Foundry Association, of Evansville, Ind., has been incorporated with a capital of $100,000. The incorporators are Fred Eggert, Adam Jutzi, and Chas. F. Diekmann.

The Sheffield Cast Iron Pipe & Foundry Co., of Sheffield, Ala., has been organized with a capital of $500,000, $350,000 of which has been already paid in. The officers are J. W. Worthington, president; W. U. Parsons, treasurer; J. G. Aderton, auditor; and J. W. Worthington, S. B. McTyler and S. McGaughy, directors.

The New Bern Iron Works, of New Bern, N. C., has been incorporated with a capital of $20,000, by W. A. McIntosh, E. Williams, and W. T. Brinson. The company intends to carry on a general iron foundry and machinery business.

The Conway Steel Range Co., of Toledo, O., has been incorporated with a capital of $100,000, the incorporators being John Conway, John H. Fitzpatrick, Adam J. Ulrich, Grant L. Ulrich and Frank E. Ulrich. This company has been in business for some time and the incorporation is merely a change from a partnership to a stock company.

The Marshalltown Aluminum & Brass Foundry Co., of Marshalltown, Ia., has been incorporated with a capital of $5,000. The incorporators are: Chas. Glick, I. T. Forbes, P. M. Bentley, E. L. Williams and P. Wishart. Mr. Forbes will be manager of the new concern.

The South Pittsburg Foundry Co., South Pittsburg, Tenn., maker of stoves, commenced operations on April 28. The officers of the company are: T. G. Garrett, president; A. A. Cook, vice president; and J. J. Bowers, secretary.

Fires :—

The McBryde Iron Works, Columbus, Ga., were destroyed by fire May 3. Loss $2,000; insurance $1,000.

The plant of the Plainfield Foundry Co., Plainfield Junction, Conn., was burned May 4. There was no insurance on the buildings. The foundry had been closed for the last six months.

Plate mill No. 5 at the plant of the Lackawanna Steel Co., Buffalo, N. Y., was damaged by fire May 6. The loss is estimated at $5,000.

The agricultural implement factory of P. K. Dederick's Sons, Albany, N. Y., was nearly destroyed by fire May 8. The loss is $20,000, with no insurance.

The pipe works of the Schaw-Batcher Co., Sacramento, Cal., were damaged by fire May 7. One building was destroyed and others were badly scorched. The loss is estimated at $1,500.

Fire destroyed the foundry and the entire works of the Desjardins shops at St Andre, Kamouraska, Quebec, on April 26 The loss is estimated at $150,000, upon which there is some insurance.

The Gurney foundry at Toronto, Ontario, was slightly damaged by fire on May 4.

The Chicago Foundry, of Spokane, Wash., was damaged by fire to the extent of $1,000 on April 12.

The foundry building of Thos. Taylor, of Falls City, Neb., was destroyed by fire on April 20. The loss is between $3,000 and $4,000, with no insurance.

New Construction :—

The Public Service Corporation, of Newark, N. J., within a short time will break ground for the construction of new buildings at the Plank Road shops. When completed they will be the most complete trolley car shops in the country. The machine shop will be 335 x 140, paint shop 354 x 195 and a general shop 390 x 195.

The Chicago File & Rasp Co. will build a new plant on North Robey street and Webster avenue, Chicago. It will be two stories, 80 x 110 feet, and will cost $35,000.

The Detroit Lubricator Co., Detroit, Mich., will make additions to its plant, enlarging the capacity of its machine room and tool room.

A. Anderson & Co., of St. Louis, Mo., have contract to erect proposed repair shops and car barn for the Knoxville Traction Co.; car barn to be 70 x 300 feet, shops 95 x 180 feet, of fireproof construction and cost $75,000.

The Kansas City Plow Co., Kansas City, Mo., will erect a building 60 x 100 feet on site recently purchased at Seventeenth street and Oakland avenue.

The Hoover Stove Co., Kansas City, Mo., has purchased site on which to erect a plant 60 x 100 ft.

The Gleason Co., of Rochester, N. Y., is constructing several new buildings, including a foundry 308 x 110 ft.

Work is being rapidly pushed forward on the Westinghouse stoker plant at Attica, N. Y. The foundry building, which was laid out to be 250 x 60 ft., will be extended to 500 ft. in length.

G. W. Schmidt & Son, of Iowa City, Ia., are building an addition to their foundry and iron works.

J. S. Allen & Son., of New Castle, Ind., will erect a foundry for the manufacture of gray iron and brass castings. The foundry will be 40 x 120 ft.

J. J. McDougal, of Mitchell, S. D., has purchased a site and will begin the erection of a machine shop and foundry building 50 x 80 ft.

The Dent Hardware Co., of Fullerton, Pa., has been making additions to its plant, which will greatly increase its output. The company expects soon to enlarge its foundry building.

Wesley Patschke, of Lebanon, Pa., has commenced the erection of a new foundry. Mr. Patschke is a well known molder and has several others associated with him in the business.

The American Brake Shoe & Foundry Co., of Chicago Heights, Ill., has awarded the contract for a two-story office building and for an extension to its steel foundry plant.

The Anniston Foundry & Machine Co., of Anniston, Ala., is to erect an addition 85 x 1,000 ft. for the manufacture of gas service boxes, soil pipe and fittings.

The Union Twist Drill Co., of Athol, Mass., has acquired the plant of Gay & Ward, and is making plans for extensive additions to the plant, including a building for storage of raw material, cutting room, smith shop and hardening department. John A. McGregor, formerly of the Morse Twist Drill & Machine Co., will be superintendent of the new plant. The new building will be complete in time for occupancy in the fall.

The Fort Worth Iron & Steel Mfg. Co., Fort Worth, Tex., started operations May 1, with a capacity of 50 tons per day. This concern manufactures merchant iron bars, round and square up to 2 in. and flat up to 1 x 4 in. The officers of the company are: T. J. Rowley, general manager; F. A. Parkmire, general superintendent, and F. M. Diver, purchasing and sales agent.

The new building of the Pekor Iron Works, Columbus, Ga., is practically completed, and the manufacture of fertilizer machinery and general repairs will be taken up within a short time. This concern is not in the market for new machinery at present, but will be in the near future.

The Gray & Dudley Hardware Co. has completed arrangements to start a large foundry and hardware manufacturing plant at Nashville, Tenn., and has purchased a location of about 11 acres for this purpose. The company will manufacture a varied line of hardware and cast iron goods, and will employ about 150 hands.

The Moorehead Mfg. Co., of Detroit, has taken over the business of James Moorehead, who manufactured steam traps, valves, etc. The company will build a new plant, the site for which has not been definitely selected.

Large additions to the Southern Indiana shops of the Big Four railway, at Bedford, Ind., have been started. The new shops will include a foundry.

The Hawthorne Foundry & Machine Co. will move its plant to Des Moines, Ia., from Grinnell, providing a suitable location can be found. The railroad facilities at Grinnell are inadequate.

The Challenge Cutlery Co. is planning to practically double the capacity of its plant at Bridgeport, Conn. The capital stock of the company was recently increased from $100,000 to $150,000.

The "1900" Washer Co., of Binghamton, N. Y., will be increased in capacity about 50 percent. Work on the new buildings will be started in about a week.

The construction of a new round house for the Lackawanna road, at West Utica, has been started, and present plans call for its completion early next fall. In addition to the round house and repair shops there will be room enough in the new building for the offices of the master mechanic.

The Midgley Mfg. Co., of Columbus, O., has opened bids for the construction of a new plant, which will cover about five acres and care for all departments under one roof. Business with the company is reported to be beyond the present capacity of the plant, which is being operated 24 hours a day.

The Southern Indiana railway shops, at Bedford, Ind., will be extensively improved, and plans call for the construction of a large foundry and improved machinery facilities.

The new plant of the United States Hoe & Tool Co., at Columbus, O., is being rushed to completion, and the machinery will be installed as rapidly as possible.

The Salisbury Wheel & Mfg. Co., Jamestown, N. Y., has commenced the foundation work for an addition to its plant at East Jamestown, a step made necessary by the growth of the business. An increase will be made in the working force as soon as the new plans are completed.

The shops of the Atlantic & Birmingham railroad, at Waycross, Ga., burned a month ago, have been rebuilt and are about ready for occupancy. The shops have been enlarged and the various departments separated. Prior to the fire they

were all in one continuous building. They now occupy four buildings.

The Olds Gasoline Engine Works, of Lansing, Mich., has closed a contract for large additions to its plant, and a new machine shop, 237 x 36 ft., constructed of brick, will be erected. A testing shop and office buildings will also be added to the plant.

General Industrial Notes:—

The National Elevator Co., New York, recently incorporated, will sell, erect and repair, in New York, elevators made by the National Elevator & Machine Co., of Honesdale, Pa., which company has been purchased by H. F. Gurney, president of the National Elevator Co.

W. G. Austin, of St. Joseph, Mo., has arranged to sell his foundry to B. W. Kyle, of the same city, and Mr. Kyle is planning to manufacture his washing machine on a large scale, running the foundry to its full capacity.

Ed. Hay, of Portage la Prairie, Manitoba, has sold his foundry to F. W. Clayton, and the latter has taken over the management of the plant.

A company has been formed in Worcester, Mass., for the purpose of leasing the Arnold & Pierce foundry plant for a term of years, and operating it as a general foundry. The members of the company are: Alexander Hall and Alexander Rankin, who have been connected with the Holyoke Machine Co. Plans for opening the plant have been under way for about two weeks.

The Western Tin Plate & Sheet Co., of Indianapolis, Ind., has been organized by John E. Carnahan and others, who recently purchased the Juniata sheet mill, at Greencastle, Ind. The plans of the new company, which has been incorporated, are to take charge of the idle plant, equip it with new machinery and put it in complete operation before fall.

The Seattle Steel Co., on the west side of Elliott Bay, Seattle, Wash., has been reopened and fires are now burning in the five big furnaces. The company has orders on hand to keep the plant running for some time, but is equipped to take care of all business offered.

The McKinney foundry, at Oberlin, N. Y., is again taking on a full force of men, and will operate its plant the full capacity.

The Midvale Steel Co. has notified the Navy Department that the first delivery of armor plate on its recent contract will be made about June 1.

The Bowers Mfg. Co., of Lima, O., has merged with the Indianapolis Steel Roofing & Corrugating Co., of Indianapolis, Ind., and the old concern will be moved to the latter city. The capital stock has been increased from $15,000 to $75,000, and the company will occupy a new building, with offices, sales room and warehouse.

The Toledo Stove & Range Co., of Toledo, O., has shipped to Seattle, Wash., a consignment of 102 ranges, on its order of 500 ranges, which was probably the largest ever received at one time by any company for shipment to the Pacific coast. The first shipment was made in a heavily built, specially constructed car, and the remainder will be forwarded as soon as the factory can turn them out.

L. P. Zimmerman has been elected president of the National Furnace Appliance Co., of Columbus, O., which was recently incorporated with a capital stock of $25,000. The company will manufacture a new smoke consuming furnace.

The National Foundry Mfg. & Supply Co., of Williamsport, Pa., is moving into its new quarters, which were formerly used by the Larzalere Machine Co. The plant has been entirely remodeled and the size of the foundry increased by a large brick addition.

The Dings Electro-Magnetic Separator Co., Milwaukee, has received an order for an $8,000 separator plant for a mining company in the Wisconsin zinc field.

FOREIGN IRON AND STEEL NOTES.

The Great Central Railway Co. has decided upon the erection of extensive car works at Dukinfield.

A large foundry is to be erected near the railroad at Chapel Hill, Braintree, by Lake & Elliott.

The importations of German coke at Cardiff by Guest, Keen & Nettlefolds will probably be followed by Cammell, Laird & Co. entering into a contract with German coke manufacturers for the supply of their works in West Cumberland.

Charles Henderson, principal partner of the firm of Charles Henderson & Co., steel merchants, Glasgow, died on April 19, aged 70.

The Vulcan Foundry, Ltd., of Newton-le-Willows, Lancashire, has an order for an additional 30, standard-type locomotives for the Indian State railways.

Hathorn, Davey & Co., Ltd., of Leeds, have secured the contract to supply a 12,000,000 gallon steam pumping engine to the Montreal Water Works for the sum of $53,497.

Sir Alfred Hickman's firm will manufacture street-paving blocks from blast-furnace cinder in a plant now being erected adjacent to the Spring Vale works.

Excluding warships, there were 474 vessels of 1,251,343 tons gross under construction in the United Kingdom at the close of the quarter ended March 31. The last quarter shows an increase of 262,679 tons over the corresponding period of last year.

Brown, Lenox & Co., engineers, of Pontypridd, Wales, have commenced the manufacture of volute and spiral springs of all kinds. The department has been equipped with special machinery and is under the management of J. Mitchell, late of J. Mitchell & Co., the Napier Works, Sheffield. Many new shops will afford employment to many workmen.

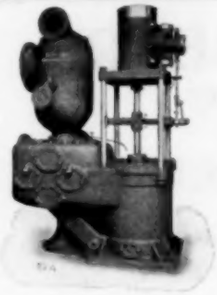
Contracts have been recently placed by the Dunderland Iron Ore Co., Ltd., with the Chain Belt Engineering Co., of Derby, for four sets of electrically driven car haulage gears, two heavy pan conveyors for handling iron ore briquettes, and twelve inclined spiral conveyors for dealing with iron ore concentrates.

The London & Northwestern Railroad has arranged for a party of leading officials to visit the United States and study American methods. H. Hibbert and C. Lawrence will represent the directorate, and the party will include G. Whale, chief mechanical engineer, of Crewe; R. Turnbull, superintendent of the roads; C. E. Grasseman, freight manager; and J. Dawson, traffic superintendent.

The death is announced at Cleveland, England, of Capt. Thomas Bullock, of Birchfield. He was a director in the Birmingham Screw Co., a concern which was purchased by Nettlefolds, and was also prominently connected with the National Arms & Ammunition Co., whose works at Sparkbrook were ultimately acquired by the government for the repairing factory.

The visit of the Iron and Steel Institute to Sheffield in September is promising well; already the guarantees and donations amount to some $30,000. The programme includes a luncheon and dinner given by the Sheffield reception committee; excursions to places of interest in the neighborhood, and a reception and ball given by the Lord Mayor, Alderman Jonas, and the president of the institute, R. A. Hadfield, respectively. Thomas Firth & Sons, Ltd., Hadfield's Steel Foundry Co., Ltd., and William Cook & Co., Ltd., are making arrangements to entertain members at luncheon at the works.

At the annual meeting of General Electric Co.'s stockholders C. A. Coffin, R. T. Payne 2d, Oliver Ames, Eugene Griffin, J. P. Ford and George P. Gardner, representing 280,000 shares, were present. The following directors were elected: Gordon Abbott, Oliver Ames, C. A. Coffin, T. Jefferson Coolidge Jr., W. M. Crane, Frederick P. Fish, George P. Gardner, Eugene Griffin, I. K. Henderson, Henry L. Higginson, J. Pierpont Morgan, J. P. Ord, Robt. Treat Paine 2nd, E. W. Rice Jr., Charles Steele.



Air Pump and Jet Condenser.

DEAN BROS. STEAM PUMP WORKS

INDIANAPOLIS, IND.

DUPLEX PUMPS for all purposes; Hydraulic Pumps, with forged cylinders. Fly Wheel Pumps.

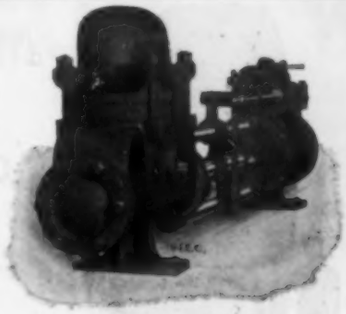
JET and SURFACE **Condensers**

All sizes of Vacuum Pumps up to 60 inch cylinders

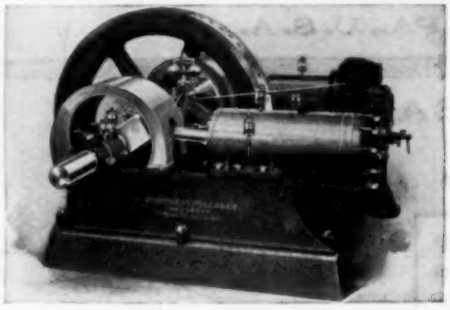
Try one of our SIMPLE boiler feeders

The largest line of pump patterns in America

Send for printed matter



Simple Steam Pump.



WARREN GAS ENGINES

SINGLE, DOUBLE and MULTI-CYLINDER TYPES

30 H. P. and upwards

ADAPTED FOR ALL POWER PURPOSES.

Economy and Regulation Fully Guaranteed.

STRUTHERS-WELLS COMPANY

Warren, Pa.

NEW YORK OFFICE: 26 Cortlandt Street

AIR LIFT PUMPS

Chicago, Ill.
Cleveland, O.
St. Louis, Mo.

THE **INGERSOLL-SERGEANT** DRILL CO.

26 Cortlandt Street, NEW YORK

Boston, Mass.
Pittsburg, Pa.
Philadelphia, Pa.

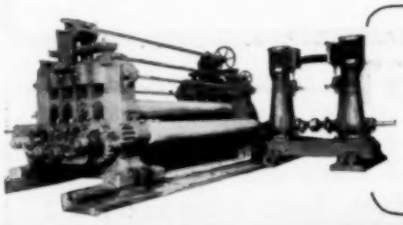
J 14

OUR OIL TEMPERED CAR SPRINGS ARE UNEQUALED

For Standard and Special Requirements

High Grade Tempers Guaranteed

Rolling Mills **HARROW SPRING COMPANY, Kalamazoo, Michigan** Spring Works



ROLLING MILL MACHINERY

TIN PLATE MACHINERY
CIRCLE CUTTING PLATE AND BAR SHEARS
STRAIGHTENING MACHINES

R. S. NEWBOLD & SON COMPANY

Founders, Machinists and Boiler Makers

Office and Works, NORRISTOWN, PA.

Western Agents, W. P. LEMLEY, 518 Park Bldg., Pittsburg, Pa.

TROPENAS CONVERTER STEEL PROCESS

With one 2-Ton Converter, makes Castings from 1 oz. to 13,000 lbs.

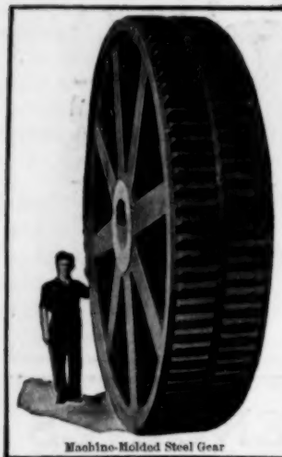
AVERAGE OF 22 TESTS MADE BY U. S. GOVERNMENT.

Sulphur .035%. Ph. .045%.
Elastic Limit 34374. Tens. Strength 67722.
Elongation 33,36%. Reduct. of Area 46,4%.
Bent Cold 186 Degrees.

20 PLANTS ERECTED IN U. S. AND CANADA.

Sole Agents: **POWELL & COLNÉ,**

11 Broadway, NEW YORK.



Machine-Molded Steel Gear

MACHINE-MOLDED GEARS

SPUR BEVEL MITRE

CORLISS AND PISTON VALVE ENGINES

—FOR—

Rolling Mills, Blast Furnaces and Power Plants

ROLLING MILL MACHINERY

STEEL, SAND AND CHILLED ROLLS, STEEL CASTINGS

MESTA MACHINE COMPANY

PITTSBURG, PA., U. S. A.

BASIC OPEN HEARTH

STEEL

SLABS

Manufacturing from the ore to the finished product insures greater uniformity of quality.

SHEET BARS

Basic Pig Iron, Pipe, Skelp, Wide Flats and Universal Plates.

LABELLE IRON WORKS

STEUBENVILLE, OHIO

ESTABLISHED 1842. INCORPORATED 1868.

JOSEPH T. RYERSON & SON.

GENERAL OFFICES AND WAREHOUSES, CHICAGO.
EASTERN OFFICES, NEW YORK AND PITTSBURG.

Always on hand—
largest stock in America.

Sent regularly —free —if you wish it.

In times such as this when mill deliveries are far behind, we are in a splendid position to help you by furnishing iron and steel from stock.

All sizes—Immediate Shipment.

OUR STOCK LIST

has a blue cover—it is the "Blue Book." Are you getting it? We send it gladly upon request. We carry in stock structural steel, plates, sheets, rivets, boiler tubes and a full line of iron working machinery and boiler maker's tools. These are fully listed and described in our "Blue Book." Write for it.

SCULLY STEEL & IRON COMPANY

Chicago, Ills.